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22 MAY 1952

**AGRICULTURAL**

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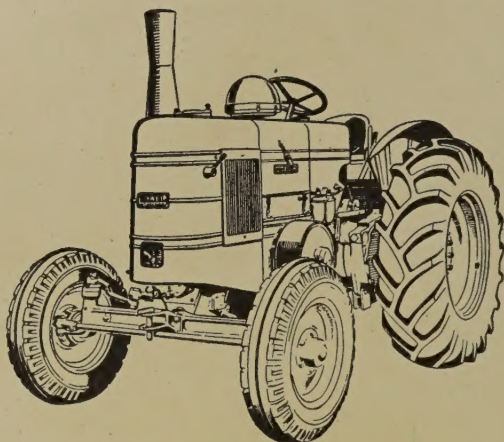
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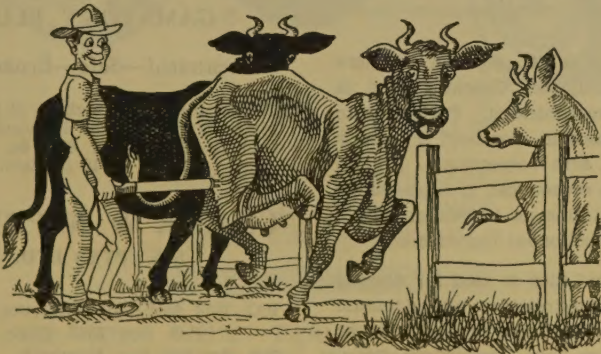
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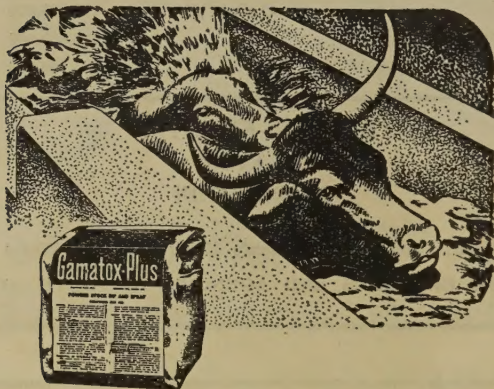


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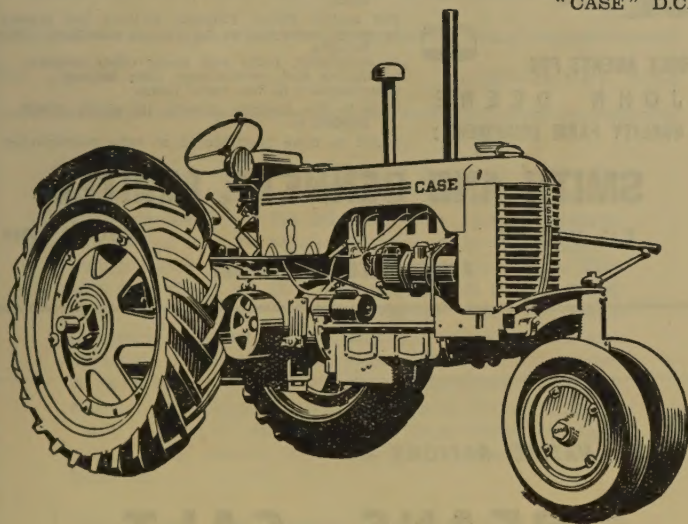
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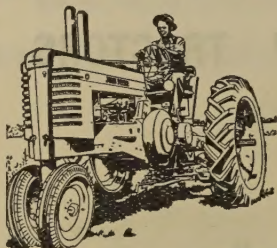
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# THE RHODESIA Agricultural Journal

THE JOURNAL OF THE MINISTRY OF AGRICULTURE  
Southern Rhodesia

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Editress : Marie H. Pardy, B.Sc.

(Assisted by the Staff of the Division of Agriculture and Lands)

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Vol. 49, No. 1

January-February, 1952

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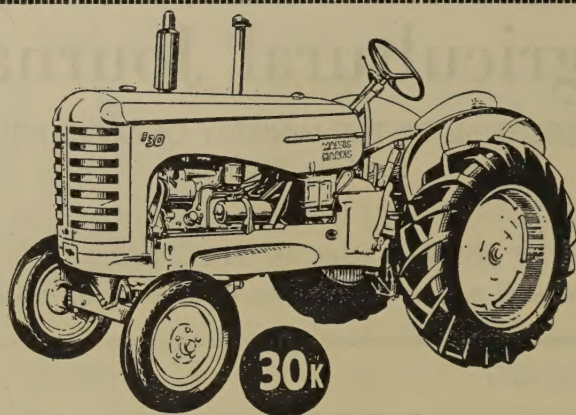
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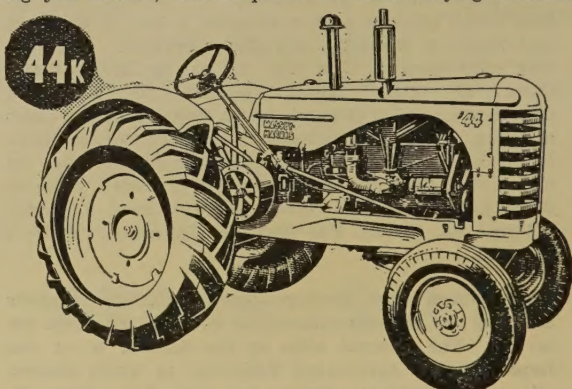
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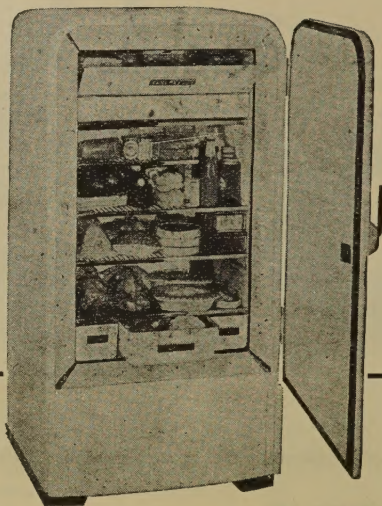
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# THE RHODESIA Agricultural Journal

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Vol. 49, No. 1

January-February, 1952

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## Editorial

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### Notes and Comments

#### PRODUCTION OF PEPPERMINT OIL IN WASHINGTON, U.S.A.

An interesting account of Peppermint Oil Production is given in "Colonial Plant and Animal Products," Vol. II, No. 1, 1951, and as many enquiries on this subject have, I understand, been received by our Department of Agriculture, a short account of this article should be of interest to readers.

Actually Peppermint Oil has been cultivated in the U.S.A. since 1816. At present it is grown mainly in two areas, the Mid-West including S. Michigan, N. Indiana and N. Ohio, and the Pacific North-West (Washington and Oregon).

Washington and Oregon, in spite of losses from a virus disease of Peppermint, have produced the highest amount of oil during the last two years.

Results of an economic survey of the production of Peppermint Oil in Washington have recently been published in "Popular Bulletin No. 199 (1950) of the Agricultural Experiment Station, Institute of Agricultural Sciences, the State College of Washington."

In the Lower Columbia Plantations of 1,000 acres, the yield is from 30 to 70 lb., while in the Kennewick District 25-100 lb. oil per acre are produced from 3,000 acres. The yield from Indiana and Michigan is less than half of this, while the average yield per acre for the whole of the U.S.A. is 34 lb.

The cost of growing, harvesting and distilling the oil amounted to 245 dollars per acre in 1947.

Peppermint Oil is used mainly as a flavouring agent, and in U.S.A. over 50 per cent. is used in chewing-gum.

There is a wide variation in the prices paid for oil. In December, 1925, the price reached 25 dollars per lb., whereas between 1929 and 1947 the average price was 3.38 dollars per lb. Prices rose from 1939 (about 2 dollars per lb.) until 1947 when 7 dollars was reached. Since then prices fell to about 5 dollars



in 1949. Before growing Peppermint careful consideration should be given to the economic side, as the oil has restricted uses.

Our Horticulturist has supplied brief notes on Peppermint Production in Southern Rhodesia.

From time to time requests have been received regarding the possibilities of this crop in Southern Rhodesia owing to the high prices which have at times been paid for the crop.

About three years ago large scale experiments were carried out at Mazoe with selected planting material imported from England and America.

After intensive propagation, large stocks became available for planting and, although the crop soon became established, the growth was poor and the plants refused to flower.

This non-flowering was very serious, as the greatest oil content is reached at flowering stage.

A further trial the following season yielded no better results and the crop was therefore ploughed in.

Last year small trials were carried out at Melsetter, but there is no recent information regarding these trials. Should results from here prove promising much investigational work remains to be done regarding the economies of the crop in Southern Rhodesia.

#### NEW YEAR HONOURS LIST

We extend our hearty congratulations to the following officials connected with Agriculture who have received awards:—

Major H. G. Mundy, O.B.E., who now receives the C.B.E.

Mr. Walter Sole, awarded the O.B.E.

Mr. J. F. Duguid, awarded the M.B.E.

#### RETIREMENT OF MR. P. H. HAVILAND, Director of Irrigation.

Mr. Haviland retired from the service in January, and tributes to his work in the Irrigation Department were paid by Mr. J. M. Caldicott, Minister of Agriculture and Lands.

Mr. Haviland was appointed to the Irrigation Branch, as it was called then, in 1923, as an Additional Assistant Engineer, and in 1929 was transferred to Bulawayo to open the Matabeleland Office of the Irrigation Branch.

When the Second World War broke out he served with the Royal Engineers in the Middle East, returning to Salisbury in December, 1943, when he became Director of Irrigation.

During his term of office Mr. Haviland has had the satisfaction of seeing the development of major water schemes with which he has been closely associated, the last of these being the Hunyani Poort and Kariba Schemes.

His colleagues in the Department are glad to know that he is to remain in this Colony, and wish him many happy years in his retirement.

# Notes on Freshwater Fishes in Southern Rhodesia

By R. A. JUBB, B.Sc.

## Family CLARIIDAE.

### CATFISHES.

There are two genera distinguished as follows:—

- (i) A long single dorsal fin supported throughout by rays—*Clarias*.
- (ii) Two dorsal fins, the anterior one with rays and the posterior one adipose—*Heterobranchus*.

#### Genus *Clarias*.

Species of this genus are to be found throughout Africa except south of the Orange River.<sup>(1)</sup> The long, eel-like body, flat, bony head and eight long barbels around the mouth are characteristic of these catfishes which are commonly known as barbel in this Colony.

Barbel are notorious for their ability to remain alive out of water for long periods; this is enabled by accessory breathing organs attached to the gills. This additional breathing apparatus enables the fish to survive in mud, foul water or to travel overland for short distances. Sandon<sup>(2)</sup> records the observation of thirty barbel, *Clarias lazera*, crossing from a shallow swamp to the backwater of a river. The total distance overland was about 200 yards and was crossed in a little over an hour! This explains why species of *Clarias*, or barbel, are found in just about every river and dam in the Colony, except where cold water temperatures restrict its invasion. In enclosed waters these fishes are a positive nuisance to persons interested in fish farming, as, being predators and scavengers, they interfere with fish nests, fry and fingerlings.

Information about the breeding habits of barbel is meagre, but they appear to come upstream and spawn in the vleis often found at the headwaters of our rivers during the rainy season. This agrees with observations by Irvine<sup>(3)</sup> who, in discussing *Clarias senegalensis*, says they spawn in swamps during the rainy season.

Unfortunately, the flesh is not particularly palatable to Europeans, and the African regards it as a food but does not make any particular effort to capture these fish in any great numbers. In the northern Territories, particularly along the lakes, the oil obtained by boiling down species of *Clarias* is used to improve the nutritive value of other types of fish being cured. It has recently been discovered<sup>(4)</sup> that the liver of *Clarias mossambicus* is very rich in Vitamin A; this species is one of our more common catfish.

Barbel are preyed upon extensively by crocodiles, otters and the magnificent fish-eagle, *Cuncuma vocifer*. With the spread of

civilisation the only predator left in the populated areas is man. The results of one "Barbel Competition" would not feed a pair of fish-eagles for more than a few days, and it is seldom that the remains of any other type of fish are found around their nests.

There are several species of *Clarias* to be found in our rivers, but two of the more common, and certainly the larger, will be described.

*Clarias gariepinus*. Burchell. Barbel or Catfish. Fig. XXV.

Native names: "maramba" along the Zambesi, and "nyamague" along the Limpopo. The native names are difficult, and the above will be found to describe any species of *Clarias*. A very large specimen is "sampa"; Pitman<sup>(5)</sup> designates the native name "sampa" to *Clarias loangensis*. Sometimes a large specimen of *Clarias* is called "vundu," but this name, along the Zambesi, is used exclusively for *Heterobranchus*.

**Distribution.**—One of the few fishes common to the Orange River, the Limpopo and the Zambesi River systems.

**General Description.**—The four pairs of long barbels around the large mouth of the flat, bony head are conspicuous on first acquaintance. The environment has some effect on the general colour, but usually the dorsal surface is dark green with light yellow-green belly and a blending of the colours on the sides giving a mottled effect. This species grows to a large size, and the Transvaal record is a fish of 38½ lbs. and length 4 ft. 8 ins., caught on rod and line. Fish of up to 100 lbs. in weight have been speared or netted.

Being a predator, almost any bait can be used, something fishy or meaty being the best.

*Clarias mossambicus*. Peters. Barbel or Catfish. Fig. XXVI.

Native names: "minqa" above the Victoria Falls, "maramba" along the Zambesi system below the Falls, "makonje" along the Sabi River system and "nyamague" along the Limpopo. Again, these names may be used for anything resembling a barbel.

**Distribution.**—The rivers and lakes of Central Africa as far south as the Limpopo system. Found in Lake Nyasa, and is more common in the smaller rivers than the previous species.

**General Description.**—The general colour is much darker than *G. gariepinus* and the mottled effect along the sides not prominent. Any bait can be used; frog is particularly useful. Some specimens show surprising agility when feeding near the surface and will take a bass plug, small silver spoon, bass fly or other bait the moment it hits the surface of the water and give a spectacular performance on light tackle. Undoubtedly heavier fish can be caught, but the average weight is from 7 to 12 lbs.; length 24 to 30 inches.

*Genus Heterobranchus*.

*Heterobranchus longifillius*. Cuvier and Valenciennes. Fig. XXVII.

The native name has been adopted, and this fish is commonly known as "vundu."





Fig. XXV. Barbel or Catfish. (*Clarias gariepinus*.)  
 [Gilchrist & Thompson after Boulenger]



Fig. XXVI. Barbel or Catfish. (*Clarias mossambicus*.)  
 [Gilchrist & Thompson after Boulenger]



Fig. XXVII. Vundu. (*Heterobranchus longifiliis*.)  
[Gilchrist & Thompson after Boulenger]

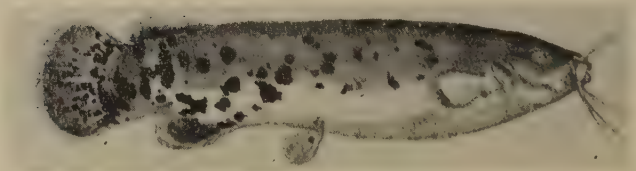


Fig. XXVIII. Electric catfish. (*Malapterurus electricus*.)  
[After Boulenger by courtesy of the British Museum.]



A large specimen of "vundu" taken  
by Mr. K. Morris, Zambesi River.

**Distribution.**—Fairly common in most of the large rivers and lakes of Central Africa, and the Zambesi River is its southerly limit. It is not found in Lake Nyasa or the smaller tributaries of the Zambesi.

**General Description.**—Easily distinguished from *Clarias* species by the split dorsal fin. The dorsal surface is very dark green and belly light yellow-brown. Except for the adipose dorsal fin, the fins are fringed with orange or red.

The "vundu" is a real heavyweight, and it is not known to what size it grows. One of the heaviest fish of this species on record (\*) is one of 125 lbs. and 6 ft. in length taken from Lake Rukwa. Anglers visiting the Zambesi River and fishing at the confluence of the Kafue and the Zambesi, or the confluence of the Luangwa and the Zambesi, can expect to catch "vundu" of 60 lbs. and over; reports of being broken up by monsters are not infrequent! The size of the fish obviously indicates tackle capable of handling a sluggish but powerful fighter which usually sounds deeply. A "vundu" will apparently take anything with flesh on it as bait, and from stomach contents is not averse to eating snakes!

#### Family MALAPTERURIDAE.

*Malapterurus electricus*. Gmelin. Electric Catfish or Electric Barbel. Fig. XXVIII. Native name not known.

**Distribution.**—Widely distributed in Central African rivers and lakes, with the Zambesi River as its southerly limit. Found in Lake Nyasa, but does not appear to come very far up those tributaries of the Zambesi which have their source in Southern Rhodesia.

**General Description.**—Until you touch it and get a good jolt, this fish is likely to be mistaken for a barbel. The dorsal fin is very short and near the tail and there are only three pairs of barbels around the mouth. The colour varies, but is usually a muddy grey with dark blotches. Specimens caught near Chirundu Bridge on the Zambesi River have not been larger than 28 inches, but this species grows to 4 ft. in West Africa.

The electric barbel is peculiar in that its electric organ is derived from glandular tissue and not from muscle. Lying between the skin and the muscles and enveloping nearly the whole body, the organ produces discharges strong enough to kill quite large fish. (†)

If you really want one of these odd fish, use fish strip or meat as bait and prepare yourself for some fun getting the hook clear.

(\*) K. H. Barnard, D.Sc. Revision of the Freshwater Fishes of the S.W. Cape Region. Annals of the S.A. Museum. Vol. XXXVI. 1943.

(†) H. Sondon. An Illustrated Guide to the Freshwater Fishes of the Sudan. 1950.

(‡) F. R. Irvine. The Fishes and Fisheries of the Gold Coast. 1947.

(§) G. J. Lockley. The Families of Freshwater Fishes of Tanganyika Territory. East African Agricultural Journal. Vol. XIV. 1949.

(¶) C. R. S. Pitman. Survey of the Fauna of N. Rhodesia.

(||) H. Chapman Pincher. Electricity and Fishes. Angling. No. 37. Vol. VIII.



# Notes on Indigenous Trees and Shrubs of Southern Rhodesia

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## *Cussonia kirkii* Seem. (Araliaceae)

By A. A. PARDY, Conservator of Forests (Research).

**Common Names.**—Cabbage tree, umbrella tree. **Native Names.**—Mushenje, mufenje (Chis.).

**General Description.**—This is one of three different species of *Cussonia* found in the tree-veld areas of this Colony and which are of somewhat similar general appearance. It normally grows to a height of about 20 feet. The leaves, on leaf stalks up to a foot in length and with stipules adhering to the base, are palmately compound with almost sessile leaflets. They are bunched at the ends of thick branches. The trees are leafless toward the latter part of the dry season. New leaves appear during October and November. The sessile flowers which appear along with the new leaves are in long, open spikes on fairly long stalks, as are also the fruits. The bark is thick and corky.

**Distribution.**—This cabbage tree is common at medium elevations and occurs in adjoining territories to the north and east.

**Uses.**—The soft, white, light wood is useful for brake blocks. The tree can be propagated from truncheons.



*Cussonia kirkii.*  
Habit Photo.

[Photo. by A. A. Pardy.]



*Cussonia kirkii.*  
Flowers and fruits.

[Photo. by A. A. Pardy.]



*Cussonia kirkii.*  
Twig with leaves.

[Photo. by A. A. Pardy.]





**Cussonia spicata** Thunb.  
(Araliaceae)

By A. A. PARDY, Conservator of Forests (Research).

**Common Names.**—Cabbage tree, umbrella tree. **Native Names.**—Mushenje, mufenje (Chis.).

**General Description.**—This is another of the three different tree-veld species of *Cussonia* which are of somewhat similar general appearance. It is commonly 20-30 feet in height and is evergreen. The leaf stalks, up to 3 feet in length with stipules adhering to the bases, and the large much-divided palmately compound leaves, crowded at the ends of thick branches, are very striking. The flowers, which appear during the earlier part of the rainy season, are sessile and crowded in spikes which are on long stalks. The fruits are also in compact spikes. The bark is thick and corky.

**Distribution.**—This cabbage tree belongs to the higher rainfall areas, being common in the mountainous Eastern Border area. In the Inyanga area, for example, it can be frequently seen in the vicinity of "slave pits." It is also found in adjoining territories where sufficiently moist conditions prevail.

**Uses.**—The soft, light wood is useful for brake blocks. It can be propagated from truncheons.



*Cussonia spicata.*  
Habit Photo.

[Photo. by G. L. Guy.]



*Cussonia spicata.*  
Leaf, flowers, fruits.

[Photo. by A. A. Pardy.]







## *Ochna pulchra* Hook. (Ochnaceae)

By A. A. PARDY, Conservator of Forests (Research).

**Common Name.**—Minyelenyele. **Native Names.**—Muminu, muparamoswa (Chis.); minyelenyele (Sind.).

**General Description.**—Exceptionally this *Ochna* may reach a height of 30 ft., although more commonly it is about 15 ft. to 20 ft. The leaves are alternate, simple, shiny, up to 3 inches long and of a somewhat elliptical shape. There are stipules, but these fall off early. The tree is leafless for a short time before the new leaves appear during October. The new leaves, of a fresh, light green colour, appear about the same time as, or shortly after the flowers appear. The sweet-scented flowers hang in small bunches. The petals are yellow, but soon fall off. The receptacle of the fruit enlarges and becomes fleshy. On this receptacle, surrounded by the enlarged red calyx, are the separate fruits, each of which is a drupe turning black when ripe. The bark on stems is rough, but when it flakes off the stem, like the branches it is smooth and of a mottled blue-grey or yellowish or pinkish colours.

**Distribution.**—This *Ochna* is widespread as a scattered tree at medium and lower elevations. It occurs mainly on sand areas, e.g., the granite sand areas near Salisbury and the Kalahari Sand formation between Bulawayo and the Victoria Falls.

It also occurs in Bechuanaland, Northern Rhodesia and Nyasaland.

**Uses.**—The wood is fairly hard and even-grained but little use is made of it. It might be suitable for such purposes as the manufacture of bobbins and certain small tool handles and for engraving.

The fruits have a high fatty oil content. This oil is considered to be suitable for the manufacture of soap and candles. The residue, after expression of the oil, might possibly make a good stock feed. It is estimated that 10 tons of fruits would produce approximately 3 tons of oil and 7 tons of cake.

The trees, however, are usually scattered, although in parts of the Kalahari Sand Forest areas there is a tendency for the trees to be in patches of about 5-15 fruiting trees per acre, and occasionally as many as 25 may be found.

The yield of fruits per tree averages about 1½ lbs., but in some years crops are poor.



*Ochna pulchra.*  
Habit Photo.

[Photo. by A. A. Pardy.]



*Ochna pulchra.*  
Twigs, leaves and flowers.

[Photo. by A. A. Pardy.]



*Ochna pulchra.*  
Twig with leaves and fruit.  
[Photo. by A. A. Pardy.]





**Acacia galpinii** Burt Davy  
(Mimosaceae)

By A. A. PARDY, Conservator of Forests (Research).

**Common Names.**—Whitethorn, apiesdoring. **Native Names.**—Umdwadwa, umtungabayeni (Sind.).

**General Description.**—This is a tree of fairly compact habit which is commonly about 70 feet or more in height and having diameters of 3 feet or more. It is of fairly fast growth and may grow as much as 6 feet in height per annum. The tree is leafless towards the end of the dry season and new leaves appear about the end of October and during November. The leaves are alternate and bipinnate with many small leaflets. There are two small stipules which become the shiny brown, sharp-pointed, curved thorns. There is a small gland about the middle of the petiole. The creamy white flowers, appearing during October, are in clusters of long-stalked spikes which, as they appear before the new leaves, are very conspicuous and of striking appearance. The pods are thin, flat, and up to 8 inches in length and about an inch in width. The bark, which in the earlier stages has persistent thorns, is thick and of a yellowish colour when young and yellowish-grey when old. It is somewhat flaky when young.

**Distribution.**—This *Acacia* is fairly widely distributed at medium and lower elevations in this Colony, but, generally speaking, could not be described as a very common tree. Although it is frequently found along river banks, it also occurs in drier areas. Specimens may be seen in the Warren Hills area near Salisbury, along the Bulawayo-Victoria Falls Road and on hill-sides in the Gwelo, Chilimanzi and Victoria Districts. It also occurs in adjoining territories.

This *Acacia* is somewhat similar to *A. dulcis* Maul. & Engl. but has larger leaves.

**Uses.**—The heartwood is of a brown colour. To a limited extent the timber is used for mining purposes and wagon construction.



*Acacia galpinii.*  
Habit Photo.

[Photo. by A. A. Pardy.]



*Acacia galpinii.*  
Twigs, leaves and pods.

[Photo. by A. A. Pardy.]



*Acacia galpintii.*  
Twigs, flowers and pods.  
[Photo. by A. A. Pardy.]





***Albizzia sericocephala* Benth.**  
(Mimosaceae)

By A. A. PARDY, Conservator of Forests (Research).

**Native Names.**—Mubora (Chis.); umbola (Sind.)

**General Description.**—This tree, until recently named *Albizzia amara*, normally has a fairly straight stem and may attain to a height of about 60 feet, although more commonly it is less than this. It characteristically occurs in the form of small clumps but may also be found growing singly. The feathery leaves up to about a foot in length are alternate, bipinnate, with many very small leaflets. There are stipules, but these fall off early. The tree is leafless during the latter part of the dry season. Flowers and new leaves appear during October. The flowers are in the form of round, fluffy heads of a light cream colour. These flower heads are on quite long stalks. The fruit is a thin, flat, brown, brittle pod with raised edges and a little over an inch in width and up to 8 inches in length. The pods contain a few flattish brown seeds which rattle in the ripe pods. These light pods are easily blown by wind. The bark is thick, somewhat striated, of a dark colour and rough.

**Distribution.**—*A. sericocephala* is widely distributed in this Colony and frequently occurs on termite mounds. It reproduces freely by sucker growth. It also occurs in adjoining territories and is found as far north as the Sudan.

**Uses.**—Little use has been made of the timber of this tree, partly on account of the tree frequently being somewhat small, and scattered. To a limited extent poles are used for mining purposes and in connection with the construction of rough buildings. It makes a good fuel wood.

The tree is ornamental and useful for shade, except, of course, when leafless. It is of fairly fast growth.



*Albizzia sericocephala.*

Habit Photo.

[Photo. by E. J. Kelly Edwards.]



*Albizzia sericocephala.*  
Leaves, pods and seeds.

[Photo. by A. A. Pardy.]



*Albizzia sericocephala.*  
Flowers and young leaves.  
[Photo. by A. A. Pardy.]





**Brachystegia boehmii** Taub.  
(Caesalpiniaceae)

By A. A. PARDY, Conservator of Forests (Research).

**Common Names.**—Prince of Wales feathers, mfuti. **Native Names.**—Mufuti, mupfuti (Chis.); umtshabela (Sind.)

**General Description.**—This tree, previously known as *Brachystegia woodiana*, is up to 60 feet in height and has a flattish crown. The large red opening leaf buds and pinks of the new leaves during October are well known. The leaves, about 8 inches long, are alternate and pinnate, with usually about 16-20 pairs of leaflets which are sessile and oblique. When conditions are particularly dry the leaflets fold along the leaf stalk. There are long narrow pink stipules which become brown as they dry. The flowers, which appear about the same time as the new leaves, are in short panicles in the axils of the leaves. The pods are thick, woody, of a dull reddish brown colour and up to 6 inches long. Prominent ridges on each pod end in a sharp point. The flat brown seeds are scattered by the explosive action of the pods. The bark is thick, rough and of a dark colour.

**Distribution.**—In addition to occurring in this Colony, the mfuti occurs in immediately adjoining territories, but it is believed it does not occur south of Southern Rhodesia.

In this Colony it forms one of the open forest types in the lower and drier areas immediately below the msasa type and above the mopani type. This type covers extensive areas, especially in the northern parts of the Colony. It likes warm aspects and sometimes may be found on such aspects in the msasa zone. It comes into leaf a few weeks after the msasa.

**Uses.**—Commonly the tree is somewhat short of bole and lacking in straightness, so is utilised mainly as firewood. When, however, it is of sufficient size and straightness it can be used for such purposes as railway sleepers, wagon construction, mining, etc. The wood is tough, the heartwood being brown. It weighs about 45 lbs. per cu. ft. air dry. The sapwood is liable to be attacked by powder post beetles and so requires some form of preservative treatment. It makes a good charcoal. The bark is commonly used by natives for bee hives, corn bins and "tambo." It has been used for tanning leather.



*Brachystegia boehmii.*  
Habit Photo.

[Photo. by A. A. Pardy.]



*Brachystegia boehmii.*  
Twigs, leaves, flowers, pod and seeds.

[Photo. by A. A. Pardy.]





# Robins

## TURDIDAE

By CAPT. G. L. JAMES, Hon. Ornithologist to the Queen  
Victoria Memorial Museum.

The Turdidae include the thrushes and chats, which will form the subject of separate articles.

The robins are shy and retiring, their habitat being thick undergrowth, where they seek their food in the decayed vegetation, the breeding ground of so many noxious insects. These birds are reasonably safe from ordinary persecution, but nevertheless should receive adequate protection.

**Natal Robin** (*Cossypha natalensis*).—This is a well distributed species of the dense forests from Natal to Somaliland. It is not, therefore, surprising that in this Colony they are confined to the Eastern Border. Shy and retiring, living and feeding in dense undergrowth, little is known of their general habits.

The nest is a small bowl of forest moss, fibres, leaves and rootlets, lined with red rootlets or fine tendrils, placed in a vertical cleft, a hollow tree stump, or on the ground at the foot of a tree, but never at any great height.

The eggs, of which a normal clutch appears to be two, are unmarked, olive or olive-greenish, and measure 22-24 x 16-17 mm. Nesting period, October-November.

**Heuglin's Robin, or White-browed Robin** (*Cossypha heuglini intermedia*).—Heuglin's Robin frequents matted bush along streams, rivers and drains; also gardens that provide the necessary cover for this retiring bird. When unmolested, this species, like so many other birds, soon gains confidence in mankind. This is proved in an Avondale garden where a pair visit the bird bath, which is situated in the open, every evening. Another pair live and nest in a garden at Hillside, while a third pair reside near the Salisbury Polo Ground. It was once considered to be a scarce bird, due, no doubt, to its shy nature, but it appears to be gaining confidence in settled areas and may well prove to be not uncommon in many places, providing there is suitable cover. It is said to be not uncommon in Matabeleland.

Its diet consists of beetles, termites, harvesting spiders and, less frequently, seeds. These particulars were obtained from an examination of stomach contents. They feed mainly on the ground and perch low down unless persistently disturbed, when they retire to dense cover and move rapidly about, hopping and running from branch to branch.

They are fine songsters, their song being rich and mellow. The long drawn-out notes increase in volume, then suddenly break off into a series of bubbling sounds. Mr. Jubb, in whose garden a pair have resided for some years, states they have a call of a repeated high note *kok-kok-kok-kok*, and an alarm note *chrrr-chrrr*. The female has a high-noted call but no song.

The nest is a cup-shaped mass of grass and rootlets, lined with fine rootlets, and should the position of the nest require it, it is ramped up on one side. A nest in a Hillside garden was placed across two low branches of a cyprus; a large ramp had

been constructed for some five inches down the drooping branches. At the lower end twigs four inches long had been laid between the two branches. The nest cavity was close to the main stem. The nest is never placed at any height from the ground, often being actually on the ground amongst the roots of a tree, on a tree stump or in a hedge. Nesting period September-October.

The clutch consists of two pale buff-olive eggs capped at the obtuse end with reddish-brown. They measure 22 x 16 mm.

The illustration shows a female (♀) and the head of a male (♂) to show the difference in the black on the head and face. In the female the black extends back to the nape, while in the male only the ear coverts are black. The colours are otherwise similar in the sexes. The female is slightly smaller than the male.

**The White-throated Robin** (*Bassonoris humeralis*).—It is a rare bird of the thick bush along the banks of rivers, streams and dams. I have seen this species at Prince Edward Dam in thick bush on a termites' nest, but could not keep it under observation owing to the petrol shortage. This robin has also been reported from the Sabi Valley. Like most shy and retiring birds, little is known of their habits, and they may well prove to be more numerous than is at present believed.

The nest, found in Natal, consisted of a mass of sticks and twigs forming a platform for the deep cup-shaped nest, which was lined with dead leaves and rootlets, placed in an overhanging bank of a small, dry spruit. The nesting period is October.

The eggs, three in number, are creamy with reddish- and purplish-brown spots concentrated at the larger end. Measurements, 21-22 x 14-15 mm.

**White-browed Scrub Robin** (*Erythropygia l. leucophrys*).—This is a rare bird in Southern Rhodesia and little is known of it.

The nest, found in South Africa, is a deep cup-shaped structure of grass stems, lined with fine fibres and placed low down in the grass or on the ground concealed under a bush.

The eggs are laid normally in threes, and are white, evenly marked with spots and freckles of reddish-brown. Measurements, 17.5-18 x 13.5-14 mm.

**Cape Robin** (*Cossypha c. caffra*).—This is the well-known "Jan Fredric" of South Africa, so called from its call, which is stated to sound like "Jan Fredric." This species is found only on the eastern side of the Colony; its most westerly habitat, as far as is known, is Marandellas. Like all robins, it frequents thick scrub and bush, where it searches for its food, which consists of a variety of insects, worms and beetles.

The nest is cup-shaped, consisting of grasses and rootlets lined with red rootlets. It is usually placed in bushes or creepers, sometimes on the ground, and never more than three feet up and well concealed. Nest period is October-November.

A clutch of eggs varying from three to four—usually three—is laid. The eggs are pale greenish, spotted and speckled with red and light brown forming a cap at the obtuse end. Measurements vary from 23-24 x 17-18 mm.



Angola White-browed Robin-Chat, or Heuglin's Robin.



**Bearded Robin** (*Erythropygia barbata rosvume*).—This bird, which is very rare, was obtained by Dr. Austin Roberts near the Lundi River in 1913, and apart from this nothing appears to be known of this species.

**Starred Robin** (*Pogonocichla stellata transvaalensis*).—It is a species of the Eastern Border, being, as far as can be ascertained, confined to the Mt. Selinda Forest area. Being shy and retiring, seeking its prey on the ground in thick forest undergrowth, it is seldom seen.

The nest is a large domed structure of grass, moss, dry leaves, small rootlets and twigs, with the opening at the side. The nest is placed on the ground amongst dead leaves at the foot of a tree and matches its surroundings so well that it is easily overlooked. Nesting period October-November.

The usual clutch of eggs appears to be three. They are of a white ground, freckled and blotched with brownish-red. Measurements 21.5-23.5 x 14.5-15.25 mm.

The stomach contents of several specimens when examined contained caterpillars, pupae, beetles and their larvae, flies, termites, scorpions, wire-worm and ants.

**Zambesi Scrub Robin** (*Erythropygia leucophrys zambesiana*).—It is a shy bird favouring the dense cover along river banks, rocky ridges and hillsides, occasionally venturing into long grass, where it conceals its nest.

It has a pleasing clear call of four notes in a descending scale, and, like most robins, can be heard in the morning and evening.

The nest is a bowl of grass and rootlets placed in a tuft of grass, usually beneath a bush. This species lays three white eggs, covered in speckles and spots of light-brown, with underlying grey spots chiefly at the larger end. Measurements, 18.5-21 x 14-15 mm.

**Swynnerton's Robin** (*Pogonocichla swynnertoni*).—This is another robin confined to the forests of the Eastern Border, where it feeds amongst the decayed vegetation beneath the undergrowth.

The nest is usually placed at the top of a stump from which new shoots have grown. The nest is cup-shaped and composed of moss, dry leaves, grass and twigs, lined with rootlets and fibres.

A normal clutch appears to be two eggs, which are blue-green, covered with spots and freckles of red-brown concentrated at the obtuse end. Measurements, 20-23 x 14-15 mm.

**Morning Warbler** (*Cichladusa arquata*).—The only record of this species in Southern Rhodesia comes from the Sabi Valley, where it was found by Mr. Townley. The following notes are taken from the "Ostrich," December, 1936, and December, 1938:—

It occurs amongst palm trees along streams, and, judging from stomach contents, it is insectivorous. Its voice is a series of whistles heard in the morning and evening.

The nest was glued to the side of a pendant leaf. It was a semi-circular shell of mud and grass roots containing a cup of woven fibres stripped from the dead midribs of palm leaves. Another was placed in the junction of a frond with the trunk. Nesting period, September-October.

Eggs, clutch two; bluish-white ground, sparingly spotted all over with red-brown. Measurements, 26-27 x 17 mm. -



# Australian Journey

## PART II

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Report on a visit to Australia and New Zealand for the purpose of studying Pasture problems.

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By OLIVER WEST, D.Sc.

Senior Research Officer, Department of Research and Specialist Services.

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(All photos. by Oliver West, D.Sc.)

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### QUEENSLAND

We arrived back at Armidale on the night of Friday, May 26th. A few hours later in a cold sleety drizzle, I went aboard the train for Queensland. The weather cleared with the break of day and for the whole of a warm, sunny day, very welcome after the shivery wait for breakfast, we chugged slowly through very lovely country on the way to Brisbane; through Glen Innes and Tenterfield, Stanthorpe and Warwick, across the Darling Downs to Toowoomba and then down the escarpment and through Gatton and Ipswich to Brisbane, where I was met by T. B. Paltridge, the Senior Research Officer (Agrostology) of the **Division of Plant Industry, C.S.I.R.O.**, in Queensland. He was responsible for organising the itinerary I followed in Queensland and during the month I spent in that very lovely country, he looked after me at every turn, solved every difficulty as it arose and generally made it possible for me to see as much as possible in the time at my disposal.

**Department of Agriculture and Stock, Brisbane.** Monday, May 29th, I spent in the offices of the Department of Agriculture and Stock, where I met Under Secretary (equivalent to Secretary for Agriculture), Mr. A. F. Bell, the Assistant Under Secretary, Mr. R. Veitch, the Director, Division of Plant Industry, Dr. W. A. T. Summerville, the Acting Director of Agriculture, Mr. N. O. Atherton and the Acting Assistant Director of Agriculture, Mr. W. I. S. Sloan, the Director of Regional Experiment Stations, Mr. W. G. Wells, the Director of Division of Animal Industry, Mr. W. Webster, and the Agrostologist, Mr. Stan Marriot.

It was a most interesting day spent among very friendly and hospitable people.

Wherever I went in Australia I found the people kindness itself and very eager to do all they could for an interested traveller, but nowhere in Australia did I feel more at home or happier than in Queensland.

It was arranged that I should spend the rest of the week with Stan Marriot on the Darling Downs. We drove out of Brisbane Tuesday morning bound for Toowoomba and on the way we visited

the **Queensland Agricultural High School and College of Agriculture at Lawes** near Gatton, where I met Mr. Nagel, who is in charge of the **Department of Agriculture Experimental Station** attached to the College. We saw some very fine irrigated pastures. The composition of these pastures did not in any way conform to current ideas on simple mixtures. Mr. Nagel's idea was to produce a general purpose pasture which would be equally productive the whole year round and he was using very complicated mixtures in which numerous species, Cocksfoot, Perennial Rye, *Phalaris tuberosa*, *Paspalum scrobiculatum*, Lucerne, White Clover, Bur and Barrel medics all found a place.

We saw very impressive stands of Sweet Sorghums, which in Queensland are used for green feed and should be able to play a big role in Rhodesian Agriculture as ensilage crops. Rice I saw growing for the first time. Rice is an important crop in some of the irrigated areas in New South Wales. Its production and sale is very carefully controlled.

### HYBRID MAIZE

The College is the centre for the production testing and certification of Hybrid Maize Seed in Queensland.

### BEEF STUDS ON THE DARLING DOWNS

From Gatton, where we lunched, we continued our journey up and over the range to Toowoomba, a tree embowered, country town as pretty as its name, and from Toowoomba next morning we set out with Mr. Ross Knott, the District Veterinary Surgeon, to visit some well known cattle studs. At Mr. White's Hereford Stud at Woodlands, we saw some fine cattle and a very good stand of lucerne, one hundred acres in rows of 42 inches apart. Row culture of lucerne and pasture grasses is very popular in Queensland. It allows cultivation and gives the individual plants a greater area of soil and therefore more water.

Later I was to see *Paspalum scrobiculatum* pastures in rows on the C.S.I.R.O. Station at Lawes.

The management of this 100 acres of lucerne was interesting. It was used in conjunction with a large acreage of rough natural pasture for fattening bullocks. Although there was no dividing fence, the oxen of their own free will, grazed on the lucerne pasture for only a limited time each day, spending most of the 24 hours on the rough grazing.

From Woodlands we went to Harrow Station to lunch with Mr. John Taylor the owner, and to see his Turanville Shorthorn Stud. The use of foster mothers (Australian Illawarra Shorthorn Cows) is a very general practice on Australian stud farms. Bull calves are grown out to a tremendous size on these heavy yielding foster mothers for the selling classes at the big shows. This is general practice and breeders who did not conform would be severely handicapped in the race for big prices, but the danger is obvious. It is likely to produce stud herds in which the cows produce too little milk to rear a calf.

From Harrow Station we returned to Toowoomba and continued on to Dalby, on the North Western edge of the downs. Next morning, Thursday, 1st June, we saw something of the Jimbour Plains, and, in the distance, Jimbour House, one of the most famous pastoral homesteads on the Darling Downs. Jimbour Station is now much sub-divided and has provided some of the richest wheat lands on the Darling Downs. Eight miles out of Dalby I photographed some very typical Poplar Box Woodland—the trees growing in a short grassland composed of *Dicanthium* spp., *Chloris* spp., *Bothriochloa* sp., Flinders grass (*Iseilema* sp.), *Sporobolus* sp., and a *Panicum* sp. *Paspalum distachya*, known as water couch, was abundant in boggy patches along the road.

On the open Jimbour Plain we were very intrigued by a most curious mirage—lakes to the left of the road looked so real that I had to walk towards them to convince myself that they were not there.

It was when we were on our way back to Dalby that I saw Spear Grass (*Heteropogon contortus*) for the first time in Australia. I was to see much more of this very familiar Rhodesian grass further North, where it is completely dominant in much of the Queensland cattle country.

#### RHODES GRASS IN PLACE OF PRICKLY PEAR

The Brigalow Scrubs, mixed woodland in which Brigalow (*Acacia harpophylla*) and Belah (*Casuarina lepidophloia*) are the usual dominants, constitute an important vegetation type, which geographically lies inland of the bunch spear grass zone along the coast of Queensland.

Formerly this zone was largely occupied by the invading Prickly Pear, but since the destruction of the pear, it has been largely converted to Rhodes Grass, which is seeded in the ash after the scrub is burned. Now there is a very much larger acreage of established Rhodes Grass in Queensland than there is in its country of origin—Africa. I had seen something of the Southern end of this vegetation in Northern New South Wales near Engonia but there was no Rhodes Grass there. We encountered the Brigalow again between Dalby and Bowenville on the way back to Toowoomba on to Warwick. Here fine Illawarra cows grazing on Rhodes Grass pasture under the shade of tall Brigalow and Belah trees made a very satisfactory picture.

#### WARWICK AND THE HERMITAGE REGIONAL EXPERIMENTAL STATION

We reached Warwick on the night of Thursday, June 1st. Next morning I was taken to see Mr. Scrymgeour's Polled Short-horn Stud (Netherby Stud). This was a remarkable experience. Mr. Scrymgeour is blind, yet he led us unfaltering through his yards and pens, describing each beast and discussing its points as he went. It was hard to realise that he could not see. He is an experienced judge and numbers of people swear that he can tell the colour of a beast by passing his hand over it.

After lunch we visited the **Hermitage Regional Experiment Station**. Here we saw some very interesting **Dwarf Grain Sorghum** Variety trials. The varieties under trial were Alpha, Plainsman, Caprock, Martin, Kalo Early, Kalo and Hegari. The heaviest yields were obtained from Alpha (a selection from "Wheatland"), 94.6 bushels to the acre and Caprock, 94.4 bushels to the acre. Kalo was the hardiest and most drought resistant variety. Kalo Early was ten days earlier than the next earliest.

The planting rate was 8 to 10 lbs. to the acre, never more than 10 lbs., and they were planted through the combine drill, rows 7 inches apart, plants continuous in the rows at about 6 inches spacing. It was claimed that this close spacing overcame the weeds and made cultivation unnecessary.

Other interesting plants noted were Poona Cowpea varieties (very upright) and the Auburn Woolly Pod Vetch, *Vicia dasy-carpa*, from Alabama, U.S.A.

We ended the day at Canning Downs Station, where Mr. C. Barnes breeds very fine Hereford cattle and thoroughbred horses. Canning Downs Homestead is one of the historic homes of Queensland. It was built in 1834.

Next morning we returned to Brisbane, through Killarney, Legume, Woodenbong, Mt. Lindsay, Rathdownie and Beau Desert. From Killarney to Mt. Lindsay we were back in New South Wales, lovely hilly country covered by magnificent gum forest. I was surprised to find *Themeda australis* covering the forest floor.

#### NOTES ON THE DARLING DOWNS

The Darling Downs, which lie west of the main Dividing Range, cover about 5,625 square miles of very fertile and mostly open, slightly rolling country, nearly all of which is suitable for cultivation and is held under freehold tenure. It is the most important agricultural area in Queensland and in addition to producing the bulk of the State's grain harvest, it supports a large dairying industry and an ever increasing fat lamb and cattle industry.

The Downs enjoy a very good and well distributed all round the year rainfall, though droughts of from 6 to 10 weeks duration are common in summer. The average at Toowoomba is 36.56, at Warwick 27.59.

The main soil type of the Downs proper is very similar to our black cotton soil—known in Queensland as "self mulching black earths." There is very little surface water, but good supplies are obtained by boring (50-400 feet).

Much trouble is being experienced in finding suitable sown pastures for the Downs; Rhodes Grass, *Paspalum scrobiculatum*, and Lucerne being the most promising to date. The main farming activities are:—

- (1) Grain Growing.
- (2) Dairying and Mixed Farming.
- (3) Crop Fattening of Sheep and Cattle.



The grain crops fit into two clearly distinct groups—Winter crops and Summer crops. Grain farms are about 600-1,000 acres in size. The principal crops are wheat, oats, barley, canary seed, Linseed, grain sorghum, which is ousting maize in popularity, maize, millets (numerous varieties) and sunflowers.

Crop fattening of sheep and cattle is usually a sideline to grain growing. Stock are purchased from Western Queensland during the late Summer and early Winter for sale in late Winter. They are fattened on young wheat, as well as oats and canary seed—later these crops are allowed to go to grain. (For further details see J. Hart, "Agriculture on the Darling Downs," Queensland agric. Journ. Vol. 69 pts. 1 and 2, 1949.)

### MANGROVES

Sunday was spent in exploring the Mangrove Swamps through which the North Pine River winds its way to the sea. To Mr. Lindsay Smith of the Botany Branch, enthusiastic authority on this most interesting vegetation, I am greatly indebted for a most interesting day.

### KIKUYA PASTURES ON THE MALENY TABLELAND

Monday morning found us travelling North out of Brisbane, across the North Pine again, through Caboolture and on to Beerwah, past the peculiar Glass House Mountains first seen and named by Captain Cook. We visited some pasture demonstration plots near Peachester. Back we went to Beerwah, lovely name, and on to Landsborough, where we turned West for the Maleny Tableland. Here were the Highlands of Kenya. We might have been somewhere near Limuru—rolling Kikuya covered country with gaunt dead trees on the skyline and relic patches of tangled evergreen forest—"Scrub" they call it in Queensland; great *Podocarpus* spp., *Araucaria*, *Agathis* and a host of other trees belonging to tropical genera, all intertwined with lianas and covered with epiphytes, called scrub to distinguish it from the Gum Forest.

Lovely dairying country; there are 400 suppliers to the Maleny Creamery, all farming 100 to 150 acres of Kikuya pasture. We visited Mr. Phil Ruddell's farm of 150 acres on which he runs about 100 Jerseys with between 50 and 80 cows in milk. Over the past two years he has supplied 17,000 lbs. of butterfat a year. He does this without hired labour. The organisation of this farm I found very interesting. The cows were milked twice a day by machine. While the milking was proceeding, an electrically powered separator was hard at work on the milk. By a very neat arrangement of feed room, milking stalls, separator room, etc., Phil Ruddell was able to bring the cows in, milk them and separate the milk with very little manual labour.

When the milking was finished, the cream cans were conveyed to his gate on the low loading platform of his Ferguson tractor. The separated milk was ridden to the pigs on the same conveyance. Pigs were used to fertilise the pasture; they were run in small paddocks, fed on milk and concentrates and rotated slowly over



the whole area. On these farms very little beyond the ordinary routine work is done by the farmer; any special job such as fencing and even ploughing is done by contract. Ruddle believed in renovating his Kikuya by rotary hoeing—this was done by a contractor. Over the hoed pasture he broadcasts maize which is grazed while the Kikuya stand builds up again.

That night we slept at Kenilworth and next morning continued in a North Westerly direction to Gympie, visiting "Kandanga," Sir Earl Page's property on the way. Gympie is well known because of the famous Curtis Nugget, 975 ozs. of pure gold, found there in the gold rush days.

Beyond Gympie on the Kilkwa road we entered country which was obviously drier and where the Themeda dominated grassland, a feature of the "Kandanga" country, gave way to *Heteropogon contortus* with *Bothriochloa intermedia*, Forest Blue and *Bothriochloa decipiens*, Pitted Blue Grass and very beautiful Blue Gums, Spotted Gums, Blood Woods and Iron Woods in open parkland formation. It was my first glimpse of cattle country of which I was to see much more later.

#### BRISBANE AND THE PLANT INTRODUCTION NURSERIES AT RUDLAND BAY

I visited the C.S.I.R.O. Laboratories in the Old University Building, and the Plant Introduction Nurseries at Rudland Bay, where I saw much of the material obtained on the South American Expedition of 1947-48. Most interesting were legumes of the genera *Arachis*, *Adesmia*, *Desmodium* and *Stylosanthes* and of the grasses numerous *Paspalum* spp. and some *Chloris* spp.

In the evening, I delivered an address at a meeting of the Queensland Branch of the **Australian Institute of Agricultural Research**.

#### THE COOPER LABORATORY AND C.S.I.R.O. FIELD EXPERIMENTS AT LAWES

Thursday we spent in the Cooper Laboratories and on the C.S.I.R.O. Field Experiments at the Queensland Agricultural High School and College at Lawes, where already I had been shown over some of the work being carried out there by the Queensland State Agricultural Department. At Lawes I met Mr. N. H. Shaw, who was in charge of the field station, and several other members of the Queensland staff of the Division of Plant Industry.

The work at Lawes includes studies on the natural Spear Grass (*Heteropogon contortus*) pastures at Lawes and at the Calliope and Rodds Bay Outstations in the Gladstone district, as well as work recently started near Goomeri and Broweena. At Calliope yield and the botanical and chemical composition of natural pastures are being measured and some success has been achieved in the establishment of the legumes Townsville Lucerne (*Stylosanthes sundarica*) and Stylo (*Stylosanthes gracilis*) from surface seeding. Preliminary studies on the effect of burning in natural pastures has been initiated.

At Lawes much of the work is concerned with the use alone and in combination of Rhodes Grass and *Paspalum scrobiculatum* pastures. In grazing trials designed to compare two varieties of Rhodes Grass, no measurable difference was found in the live-weight gains of steers on the ordinary variety and on the leafier, more vigorous Kenya variety. An addition of Lucerne to the pasture, however, produced a very significant increase in the live-weight gains during the Summer. This was found to be due to the improved quality of the feed (presence of Lucerne) and not to an improvement in the yield of grass. (Residual effect of these pastures on soil fertility is being studied in terms of yield from cereal crops.)

The Rhodes Grass and Rhodes Grass and Lucerne pastures were found to be very poor during the dry Winter months, while, on the other hand, *Paspalum scrobiculatum* and Lucerne row pastures were found to provide excellent Winter feed. *Paspalum scrobiculatum* does excellently in rows and very poorly in a sward. A very ingenious seed harvesting machine working on the vacuum cleaner principle has been designed to harvest the "Scrobic seed".

#### JOURNEY THROUGH THE CATTLE COUNTRY TO ROCKHAMPTON

On Saturday, June 10th, Dr. Davies, Norman Shaw and I began our journey through the cattle country to Rockhampton. We travelled by car from Brisbane to Gayndah through Ipswich, Esk, Nanango, Kingaroy, Wondai and Murgon.

Kingaroy is the centre of the peanut industry of Queensland and some 46,000 acres are devoted to this crop in the Kingaroy district. Crossing the hills near Nanango we travelled through extensive patches of rainforest and head Bell Birds. Between Murgon and Gayndah I saw Bottle Trees for the first time. Gayndah is on the Burnett River.

On Sunday morning we continued our journey through Biggenden, Wallaceville, Gin Gin and Miriamvale to Rodds Bay Station and most of the way we travelled through typical rolling cattle country covered by *Heteropogon* grassland under an open woodland of fine Eucalypts. Here and there we saw mobs of Hereford cattle in fine condition, but very wild, as I found when I tried to approach some on foot for the purpose of securing a photograph.

We crossed the Burnett River by the Wallacevale Bridge and on the Northern side found sugar plantations and a mill. We were a little South West of Bundaberg, famous for its Rum. At Rodds Bay Station we were welcomed by Mr. and Mrs. Desmond Shaw, who were kindness itself during the short time we were able to spend with them.

Next morning, Monday, the 12th June, we saw the work that had been done there on the establishment of legumes in the natural *Heteropogon* grassland. Considerable success was being achieved with Townsville Lucerne, which had been seeded over several

hundred acres, and promising results were being obtained with *Stylo* and *Phaseolus lathyroides*.

Very interesting were the results of experiments in the poisoning of regrowth gum. Old trees are ringbarked, but this is not an economical procedure in dealing with regrowth until the young trees have attained sufficient size to make ringbarking easy. In the experiments at Rodds Bay very good results were being obtained from 1% 2-4-D and from Arsenite of Soda, on cut stems and in frills. We visited Bucaan Block which lies along the coast and saw breeding cows browsing the white mangroves which line the creeks.

Tuesday morning saw us on our way first to Calliope Station (Polled Herefords), where Mr. Dick Wilson showed us some very fine stands of *Phaseolus lathyroides* and *Paspalum scrobiculatum*. We saw 200 acres of dryland lucerne growing in a valley bottom, where the water table was not very far below the surface. From Calliope Station we crossed the Calliope Range to Biloela where we slept.

#### RHODES GRASS IN THE CALLIDE VALLEY

On Wednesday, June 14th, we travelled from Biloela to Rockhampton, through Thangool, Coomanglah, across Camboon Station to Camboon and on through Walloon, Banana, Rannes, Wowan and Mount Morgan. The first part of this journey led us through the Callide Valley where relic Bottle Trees remain to show where the Brigalow was cleared and where the country-side is a sea of Rhodes Grass as far as the eye can see. This is dairying area and we saw some fine stands of dryland lucerne.

In patches of Brigalow remaining, the grasses noted were *Chloris acicularis*, *C. virgata* and another *Chloris* sp., *Paspalum jubiflorum*, *Eragrostis* spp., *Aristida* sp., Queensland Blue Grass, *Panicum* sp., *Digitaria* sp., and *Sporobolus* sp. At Thangool, in Rhodes Grass Brigalow country, we noted a group of *Bauhinia* trees 30 feet tall, small leaves.

As we travelled it became obvious that the Brigalow could be split up into several types, depending on the habitat:—

- |             |   |
|-------------|---|
| Dry Habitat | 1. Brigalow (Dry aspects).  |
|             | 2. Brigalow—Belah (Wetter aspects).   |
|             | 3. Brigalow—Soft Wood Scrub, not far removed from Rainforest.                               |
|             | 4. Brigalow—Bottle Tree and other evergreen Rainforest constituents, thick scrub or Forest. |
| Wet Habitat | 5. Rainforest.  |

The change from Brigalow to the much drier looking Silver-leaf Ironbark Woodland was extremely sudden and puzzling.

It was fairly late and beginning to rain when we arrived at our hotel in Rockhampton that night. Next morning when I said goodbye before boarding the T.A.A. Dakota for Cairns, it was raining cats and dogs.

### FLIGHT FROM ROCKHAMPTON TO CAIRNS

The weather began to clear as we approached MacKay and from MacKay to Cairns we voyaged through a fairyland of indescribable beauty and colour—the delicate tints of the coral sea along the Barrier Reef, the deep blue of the sea itself and the dull greens and the odd shapes of the continental islands, the nebulous shore, where sea met land in mangrove swamp with never a wave and the clear cut lines of the Great Dividing Range on the Western horizon.

The islands of the Whitsunday Passage gave way to an orderly array of sugar fields as we left the sea to fly over Home Hill and Ayre, small towns separated by the Burdikin and its Deltas, then Townsville and Magnetic Island and we were over the sea again, over Palm Island, Hinchinbrook and Dunk of "Beachcomber" fame, over Cape Grafton and Trinity Bay into Cairns with one long view before we landed up the coast to Cape Tribulation.

### PASTURES AND FARMING ON THE ATHERTON TABLELAND

Mr. T. G. Graham, Agrostologist in the Division of Plant Industry, State Department of Agriculture and Stock, met me on the aerodrome. We started by car up the new road over the range to Mareeba and on to Atherton.

The Atherton Tablelands are famous and justly so. Atherton, less than 40 miles from the sea, is situated well within the Southern tropics ( $17^{\circ}17'$  South Latitude), yet at 2,466 feet its climate is cool and pleasant and it enjoys a splendid, though decidedly Summer, rainfall ( $51.84''$ ),

Agriculture is varied on the tableland North of Cairns. At Mareeba (Altitude 1,200 feet) and Dimbulah, tobacco is the principal crop. At Mareeba it is grown under irrigation. Around Atherton the country is devoted to the growing of maize, with some peanuts and perhaps some cowpeas for seed. South East of Atherton on the road to Herberton and to Ravenshoe (Altitude 3,000 feet) dairying is the principal enterprise.

The maize farms are about 200 acres in size, of which about 140 acres are devoted to maize and about 10-15 acres to peanuts. No stock are kept—this is typical of the great degree of specialisation which characterises Australian agriculture and is due largely to the non-existence of agricultural labour.

The Dairy Holdings are on Molasses Grass or *Paspalum* or *Kikuya* and average 180-200 acres in size. Thirty or forty cows in milk is the average number.

We visited the **Kairi Regional Experiment Station** where I was very impressed by the behaviour of two legumes growing in nursery beds:—*Glycine javanica* from Salisbury and *Clitoria ternata*.

Molasses Grass was making a very fine show on steep slopes from which the scrub had been cleared. Higher still *Kikuya* and



White Clover dominated the pastures. Near Ravenshoe I was able to observe a very interesting ecotone between the scrub (Evergreen Rain Forest) and Eucalyptus Woodland. The scrub appeared to be invading the stand of Eucalypts. We visited the Tully Falls, situated in magnificent rain forest and then made our way down the range again through Milaa Milaa to Innisfail. The last lap of this journey was rather hair raising, made as it was along very winding mountain roads in the dark and with a very thick fog which reduced our range of visibility to a few feet.

#### GRASS—LEGUME PASTURES AT SOUTH JOHNSTONE

Next morning Mr. Graham took me out to Utchee Creek, where tall rain forest (scrub) is being converted to grass and legume pasture, and then we went back to the **Bureau of Tropical Agriculture** at South Johnstone. I was greatly impressed with the Grass—Legume pastures at South Johnstone and at Utchee Creek. Tall vigorous tropical grasses with rampant, scrambling legumes, plants in harmony with their environment and a complete break with the Perennial Rye, White Clover obsession which has hampered for so long the development of balanced pastures in the tropical and Summer rainfall regions.

The grasses were Guinea Grass (*Panicum maximum*), Para Grass (*Brachiaria purpurascens*) and Molasses Grass (*Melinis minutiflora*); the legumes Puero (*Pueraria phascoloides*), Centro (*Centrosema pubescens*), Calopo (*Calopogonium mucunoides*) and Stylo (*Stylosanthes gracilis*); in addition *Desmodium scorpiurus*, *D. heterophyllum* and *Dolichos hosei* were showing promise. The very best mixture appeared to be Guinea Grass and Centro, the next best Molasses Grass and Puero, but this pasture was falling off and was being invaded by Centro. The worst was Calopo and Molasses; Calopo is very unpalatable. One of the most interesting mixtures was Guinea and Stylo. Here the Stylo had been completely ousted by the grazing pressure imposed and the pasture was being invaded by Centro—an amazing colour change followed this invasion—the portions of the pasture that included Centro being dark green, while the rest of the pasture was much paler in colour.

At South Johnstone there are ten plots each two acres in size. They are grazed by a herd of 16 oxen, two plots at a time for four days. The grazed plots are spelled for 28 days after grazing. The pastures carry one ox to one and a quarter acres. South Johnstone and the coastal country around it is a sugar-growing area—its climate is typical of the wet tropics. The rainfall at Innisfail is 142.61 inches.

Autumn planting and the harvesting of 12 months old cane is the usual practice. Because of the land assignment system in Queensland, where in order to control the amount of cane produced, cane culture is restricted by law to specific beacons areas on each farm, the typical rotation is one planted and two ratoon crops in four years—the fourth year being devoted to a green manure crop (usually cowpeas), all that is possible under the assignment system. The system amounts to compulsory monoculture and is not calculated to maintain structure or fertility.



In the Burdikin Valley, where cane is irrigated, trouble is already being experienced. The soils are becoming impervious and irrigation is becoming increasingly difficult. At South Johnstone, Graham noted a very marked improvement in the cane on old cane land that had been put down to Puero for three years. This improvement is still visible in the ratoon crop.

It is obvious that when the Archaic land assignment law is revised—as revised it will have to be—the work that is being carried out at South Johnstone will have a very important bearing on the future of the Queensland Sugar Industry.

Farming generally around South Johnstone appeared to lack conservation consciousness. The sugar fields were all straight lines and right angles with no relation to the contour, but because of the high rainfall and the lush vegetation, visible signs of erosion were not prominent.

It is worth noting that all cane in Queensland is burned before cutting. This is apparently because the cane cutters refuse to cut unburned cane. There is some justification for this attitude because of the presence of Weil's Disease (*Leptospyrosis australis* A & B), which is carried by the rats in the cane fields.

#### TOWNSVILLE AND AYR

From Cairns I flew back to Townsville, where I was met by Mr. Kleinschmidt and taken down to Ayr by car. This was drier country, the rainfall at Townsville being 46.90 inches and at Ayr 41.76 inches. The sugar cane in the Burdikin Valley is irrigated with underground water pumped out of bores. About 6,000 acres are irrigated this way.

Mr. Kleinschmidt is the C.S.I.R.O. Officer attached to the **Ayr Regional Experiment Station** and has (still in the stage of establishment) some interesting pastures modelled on the work at South Johnstone. The grasses at Ayr were Guinea, Rhodes and Para and the legumes Stylo, Townsville Lucerne, Phaseolus, Centro and Clitoria.

#### RETURNED SOLDIER TOBACCO SETTLEMENT AT CLAIRE

At Claire some distance inland from Ayr, we visited an area in which the Government are settling Returned Soldiers on irrigated land for the purpose of growing tobacco. Ten settlers had already reached the production stage and it was expected that a total of 70 growers would be producing in the next two years. Each farm has 40 acres of irrigable tobacco land and the total areas of the individual farms varied from 50 to 86 acres.

The scheme provides for the loan of £5,700 in capital to each settler. This sum includes the farm, all buildings and improvements and implements, including a motor vehicle. It is interest free for three years and for the next two years interest only is paid. Thereafter and for 25 years interest and redemption are paid. The photographs show the typical set up. The buildings which are erected by the Government, comprise a very modest dwelling house, flue barn, implement shed and storage barn made of Fibrolite lined with canite.

A settler, Mr. H. McNee, told us that he was growing about 11 acres of tobacco. Sowing seed beds is staggered from mid-July to the end of August. Planting out begins in September and continues through October. The leaf is harvested from the end of November to February. Potatoes are then planted in early May and dug about August. All the cured leaf is sold at Mareeba and very good prices are being realised. The top price in June was 146d. per lb., and 52 tons averaged 87d. per lb. Mr. McNee's yield from 11 acres had been 6 tons of cured leaf. In addition he was getting 4.6 tons of potatoes per acre and potatoes were fetching £23 per ton.

#### GRACEMERE AND AN EXPLANATION OF THE DOMINANCE OF SPEAR GRASS

On Wednesday, June 21st, I flew back from Townsville to Rockhampton, where I was met by Mr. Brooks, the District Veterinary Officer and Mr. Alastair Archer of Gracemere. It had been arranged that I was to visit the **British Overseas Food Corporation's Sorghum Scheme** at Clermont, but heavy rain and flooding inland made it necessary to cancel this arrangement.

I was very tired and extremely grateful to Mr. Archer for his kind invitation to spend a few days at Gracemere. Gracemere is a lovely place, a house almost surrounded by a lake on, I think, the oldest station in Northern Queensland.

Gracemere was originally a sheep station, but burning and sheep grazing eliminated the original Themeda grassland and encouraged the present dense stand of *Heteropogon*. This made the running of woolled sheep impossible and forced the change to cattle. This in short, I believe, is the history of the Coastal Cattle Country of Queensland and of the Spear Grass, Grassland.

#### ZEBU CATTLE IN QUEENSLAND

The question of Zebu Cattle in Queensland is a very contentious one. The majority of graziers and breeders are opposed to their introduction and use, but nevertheless there are in Northern Queensland and particularly in the St. Lawrence area north of Rockhampton, a considerable number of very warm advocates for the introduction of Zebu blood. The fact that there is a large and increasing sale for cross-bred bulls showing some Zebu characteristics and for Zebu grade bulls (Pure bred bulls are practically unobtainable) at very high prices, is sufficient evidence that their popularity is increasing despite the disapproval of the Hereford and Shorthorn Stud Breeders. The Introduction, History and Behaviour of Zebu Cattle in Australia is fully discussed by R. B. Kelley in "Zebu-Cross Cattle in Northern Australia," C.S.I.R.O. Bulletin No. 172.

I was afforded an opportunity of seeing some of these cattle by Mr. Brooks, who very kindly devoted two days in taking me around several properties in the neighbourhood of Marlborough. We spent the night of the 26th at Princhester, the property of Mr. F. S. McCartney, who with his sons went to a lot of trouble in rounding up their Zebu cross herd for our inspection.

From what I could see there is very little system in the use of this Zebu blood. Breeders are all experimenting on their own account and are continually changing their experiments. The virtues claimed by the graziers are:—

- (1) That the first cross steer grows out to the same killing weight a year sooner than pure bred Hereford steers—there was very general agreement about this, but I saw no deliberate attempt to breed the first crosses.
- (2) The animals are very tick resistant.
- (3) They utilise poor pastures much more efficiently than pure bred Herefords or other British breeds and require much less looking after.
- (4) They are less affected by heat.

We returned to Rockhampton on the night of June 27, 1950. On the 28th I flew from Rockhampton to Sydney to board on the morning of Thursday, June 29th, the flying boat bound for Auckland.

#### NEW ZEALAND

The distance from Sydney to Auckland is 1,342 miles and the flight by short "Solent" Flying Boat took about 6 hours. The cloud scenery over the Tasman Sea was magnificent. Our aircraft picked its way through towering masses of cumulus with glimpses far below of patches of sea ringed about with masses of cloud. At times we flew through falling hail and as we approached the coast of New Zealand it began to rain.

Friday, the 30th of June, I spent in Auckland and next morning Saturday, the 1st July, travelled by bus from Auckland to Hamilton to visit the **Ruakura Animal Research Station**.

#### DAIRY FARMING IN THE WAIKATO

Hamilton is the capital of the Waikato District, one of the most productive dairying areas in the world. (In this connection there is a very interesting paper by W. M. Hamilton and K. J. Mitchell on "Dairy Farming in Waipa Country.")

#### THE RUAKURA ANIMAL RESEARCH STATION

The high carrying capacity of the Waikato is well illustrated by the large number of stock kept on the Ruakura Research Station. I was told that its 970 acres provided most of the keep for about 2,600 sheep, 130 beef cattle, 600-700 dairy cattle and 150 pigs.

Ruakura is a most beautiful station and one which is producing very important results in the field of Animal Husbandry. I was sorry that because of the week-end—I arrived at Hamilton on a Saturday—and the shortness of my stay in New Zealand, I was unable to gain more than a very general impression of the work in progress. I did not meet Dr. McMeekan, the Superintendent, who was away at the time of my visit.



*Phascolus lathyroides* with *Paspalum Scrobiculatum*. Grass-Legume  
Pasture on Calliope Cattle Station, Queensland.



Dryland Lucerne on cleared Brigalow near Thangool, Queensland.





Rhodes Grass on cleared Brigalow near Thangool, Queensland



Molasses Grass Pastures on cleared Forest Land, Atherton Tableland,  
Northern Queensland.





Kikuyu-White Clover, Grass-Legume Pasture on cleared Forestland,  
Atherton Tableland, Northern Queensland.



Grade Zebu Cattle on Princhester Cattle Station, Queensland.



Romney Marsh Sheep on Rye Grass-White Clover pasture at the Ruakura Animal Research Station near Hamilton, New Zealand.



Romney Marsh Sheep on the Te Awa Hill Station near Palmerston North, New Zealand.



Illawarra Shorthorns on Rhodes Grass in Brigalow between Dalby and Bowenville, Darling Downs, Queensland.



View from the Killarney Hills—note the gaunt Ring barked Trees, a feature of the Australian Landscape,



The Coastal Cattle Country—West of Gympie, Queensland.



Young Heifers on Spear Grass, Rodds Bay Cattle Station.



The work at Ruakura can be grouped broadly under the following headings:—

- (1) Artificial Insemination and Bovine Fertility — Proven merit sires are used for the insemination of dairy cows. In addition to routine artificial insemination and the training of technicians, the work of this section embraces investigations of the technique of artificial insemination, the insemination of pedigree herds, bull fertility studies, etc. Interesting is the Ruakura Grade Herd Project in which the objective is to build up a herd of grade cows from a low standard to 400 lbs. of butterfat per cow level by the continuous use of proven sires and artificial insemination.
- (2) Animal Nutrition.
- (3) Machine Milking Investigations.
- (4) Animal Breeding.

Ruakura is probably best known for the use of Monozygotic Cattle Twins in Animal Husbandry Investigations. (Ref. Hancock, J., "Studies in Monozygotic Cattle Twins: 1. Organisation of Twin Collection," N.Z. Journ. of Sci. and Tech. Vol. 30, Sect. A. No. 5, Feb., 1949, pp. 257-270).

## JOURNEY THROUGH THE THERMAL REGIONS TO PALMERSTON NORTH

On Tuesday, the 4th of July, I travelled by bus from Hamilton through Cambridge and Rotoura to Wairakei where I was able to visit the famous Geyser Valley. At Wairakei the Government are carrying out boring experiments in an endeavour to harness thermal steam for the generation of power.

Next morning the bus journey was continued along the shore of lovely Lake Taupo to Turangi and then through the Onetapu Desert (Tussock Grassland), past the snow covered volcanic peaks Tongariro, Ngauruhoe and Ruapehu to Waionru and on through Taihape, Mangaweka, Hunterville, Marton, Bulls and Sanson to Palmerston North.

## THE GRASSLANDS DIVISION, PALMERSTON NORTH

In the two days I spent at Palmerston North I visited the Grasslands Division, Department of Science and Industrial Research, where I was able to discuss the work of the Division with Mr. E. A. Madden, the Acting Director, Mr. L. W. Gorman, the Senior Ecologist and their colleagues. Mr. Bruce Levy was away and I did not meet him. Mr. Gorman was very good to me, devoting all of his time to taking me around the experiments at Palmerston North and to the Teawa Hill Country Pasture Improvement Station.

We visited too the Seed Testing Laboratories at Palmerston North and the Massey Agricultural College. Much of the work carried out at Palmerston North is concerned with the routine testing of certified seeds. This necessitates the sowing of some



9,000 small plots each year so that the plants from each line of seed can be compared with the high grade standard lines.

In addition to strain testing, the work of the station includes Plant Breeding and investigations in the Ecology of Established Pastures. Very interesting results are being obtained in studies of the effect on the pasture of the return of Dung and Urine. These are dealt with at length in:—

- (1) Sears, P. D. and R. P. Newbold "The effect of sheep droppings on the Botanical Composition and Chemical Composition of Pasture" N.Z. Journ. of Sci. and Tech. Vol. 24, No. 1 A, pp. 36A-61A, 1942.
- (2) Sears, P. D. and V. C. Goodall and E. P. Newbold "The Effect of Sheep Droppings on Yield, Botanical Composition and Chemical Composition of Pasture" N.Z. Journ. of Sci. and Tech. Vol. 30 Sect. A, No. 4, pp. 231-250.

Less impressive to my untutored eyes was the farming system experiment in which one acre plots divided into 1-10 acre paddocks represented farms and in which wethers simulated ewes and lambs (no replications).

#### AGRONOMY RESEARCH STATION AND LINCOLN COLLEGE SOUTH ISLAND

Over the week-end I travelled from Palmerston North by train, ferry and bus to Wellington, across Cook Strait to Nelson and then down the West Coast of South Island through Greymouth to the Frans Joseph Glacier.

This was a most impressive journey through fine forested country with glorious views of snow covered mountains. Monday at the Glacier was one of the most interesting and eventful days I have ever spent.

Tuesday night I arrived in Christchurch where next morning I was met by Dr. W. M. Hamilton, the Assistant Secretary to the Department of Scientific and Industrial Research, to whom I was very much indebted for the trouble he had taken in arranging my New Zealand tour.

On Wednesday morning I was called for by Dr. O. H. Frankel, the Associate Director of the Agronomy Division's Research Station at Lincoln.

On the way we picked up Dr. Hamilton, who accompanied us to Lincoln. The Research Station which adjoins the Canterbury Agricultural College (Lincoln College) is largely devoted to the breeding of new and superior strains of wheat and other crops—in addition researches in the production of vegetable seeds bred specially for New Zealand conditions, in chemical weed control and in the technique of cultivation are being carried out. Ten acres have been set aside for the use of the Grasslands Division and here Mr. W. G. Thurston carries out a programme of pasture research under the direction of the staff at Palmerston North.

I spent the afternoon at Lincoln College, where I met most of the staff and some of the students and was shown around the farm.

## WELLINGTON

Thursday in Wellington was mainly spent at the **Plant Research Bureau of the Division of Botany**, where I met Mr. A. L. Poole, the Director, and most of his colleagues including V. D. Zotov, well known for his work on the Tussock Grasslands and other ecological investigations. The work of the division includes Taxonomic Botany, Ecology including Wild Life, and Economic Botany. There are very good herbaria of flowering plants, sea weeds and pollens.

At the time of my visit the well known "Handbook of the Naturalised Flora of New Zealand" was in process of revision. New Zealand has a very impressive introduced Flora. Other researches in progress included a special study of the ecotypes of *Agropyron scabrum* with a view to the development of Tussock Grassland species for the renovation of eroded areas; studies in the seeding habits of the Beech (*Notofagus*) and in the cultivation of Phormium, an indigenous fibre plant. The Division is conducting vegetation surveys in selected areas and has concluded a detailed ecological survey of the feeding habits of Wapiti in the Fiordlands.

The Division is responsible for Plant Introduction and newly introduced plants are grown at the Experimental Area at Waiwhetu.

Before leaving Wellington I visited the offices of the Soil Bureau, where I met the Director and some of his colleagues and listened to a most interesting explanation of the genetic classification of New Zealand soils.

## WESTWARD BOUND

I sailed in the Dominion Monarch from Wellington at about 6 p.m., on Friday, the 14th July. It was the evening of a blustering, rainy day, cold and miserable, and outside conditions were no better. The Tasman, determined to live up to its reputation, gave us a very rough passage.

When we docked at Sydney on July 17th, I was met by Mr. Andrews of the C.S.R.I.O.

Wednesday, July 19th, was spent in Melbourne, where I visited the Headquarters of the C.S.I.R.O. at 314 Albert Street. After lunch Mr. Derum motored me out to Sunshine, the headquarters of H. V. McKay, Massey Harris Pty. Limited, where I was shown over some of the factory and enjoyed a very interesting discussion with Mr. Sharp, the Sales Director.

On Sunday, July 23rd, we put into Freemantle for a few hours and then we made our departure for Cape Town.

## POSTSCRIPT

## PASTURE DEVELOPMENT IN AUSTRALIA

**In Australia ruminant grazing began in 1788**—this is an historical fact as definite as 1066 and the Battle of Hastings! When did ruminant grazing begin in Africa, Asia, Europe or America?

In Australia, however, it is possible to go much further. I quote from "The Australian Environment":—"Ruminant grazing began in 1788; and livestock numbers expanded most rapidly between 1850 and 1890. Totals of 106 million sheep and 12 million cattle were attained in 1891 and 1894 respectively. Since 1940, sheep have exceeded 120 million and cattle 13 million."

It is reasonable to assume that this sudden imposition of a totally new environmental factor must have been responsible for great changes and adjustments in the balance, structure and composition of the vegetation and it is hardly surprising that:—

"The indigenous pastures, over the continent as a whole, are not well adapted to confined ruminant grazing. Almost all the useful herbage legumes, together with many grasses and miscellaneous plants . . . have been introduced from overseas . . . and associations of these dominate land subjected to grazing of sufficient intensity." (Australian Environment p. 116).

Pasture development in Australia is a classic example of the overriding control exercised by Climate on Vegetation.

In the temperate regions of the South West and South, which are characterised by Winter rainfall and Summer drought, pastures composed mainly of Subterranean Clover and Wimmera Rye Grass, Annuals of Mediterranean origin, supply the perfect answer. A similar climate is found in Southern Africa only in the Western Cape.

In the temperature regions with cold Winters, where the rains extend throughout the year and there are no periodical droughts—e.g., the New England Tableland,—Subterranean Clover and Wimmera Rye Grass pastures give way to pasture mixtures similar to those used in Western Europe and in New Zealand; White Clover, Perennial Rye Grass, Cocksfoot and *Phalaris tuberosa*, with Strawberry Clover on poorly drained soils and Italian Rye Grass and Red Clover in temporary leys.

As conditions become more tropical in this all round the year rainfall country, the temperate grasses are replaced by tropical species, *Paspalum dilatatum* on the coast of Northern New South Wales and Southern Queensland, Kikuya on the Malene and Atherton Tablelands in Queensland; while White Clover remains an important constituent of the pasture.

Ultimately, in the wet tropical regions of which South Johnstone may be taken as an example, the best pasture mixtures are composed of very robust, tall grasses exemplified by *Panicum maximum*, with vigorous climbing, tropical legumes such as *Centrosema pubescens* and *Pueraria phaseoloides*.

In the sub-tropical and tropical regions where the bulk of the rainfall is confined to the summer months, problems similar to those of Southern Rhodesia and East Africa generally, are encountered.

The bulk of the grazing is natural grassland, which has been considerably changed by the usage imposed and which is very deficient in palatable legumes, e.g., along the coast of Queensland vast areas of grassland formerly dominated by *Themeda* (Red Grass or "Rooi Gras" in South Africa), have been changed

by a combination of sheep grazing and burning to an almost pure *Heteropogon* (Spear Grass) grassland. This has forced a change in the livestock carried from woolled sheep to beef cattle.

In Australia considerable progress has been made in the introduction of grasses and in the establishment of better grass pastures in the Summer rainfall country. *Rhodes Grass* occupies millions of acres formerly occupied by Brigalow Scrub and Prickly Pear in Queensland. *Panicum maximum* is an important pasture species in Queensland. *Panicum antidotale* from India and *Cenchrus* spp. from Africa and India are beginning to play an important role in the dry country, the *Cenchrus* spp. being particularly important in Western Australia.

As in Africa, suitable Legumes for this country are the real problem, but here again a measure of success has marked the introduction of *Stylosanthes* spp., *Phaseolus* spp., etc., in the higher rainfall, Summer rainfall areas.

Principally because so much success has attended the introduction of new plants from other countries, very little attention has been paid in Australia to the management of natural pastures.

Recently, however, in the Summer rainfall areas of Queensland and elsewhere, the C.S.I.R.O. have commenced a study of the natural pastures and the problems involved in their management. From what I saw, I am convinced that investigations along these lines, will yield very profitable results throughout the Summer rainfall and the more arid regions generally.

There is abundant evidence that in these regions a very striking deterioration of the natural pasture has been brought about by bad management, better described perhaps as an absence of management. It is obvious too, that much country at present carrying sheep is covered by vegetation better adapted to withstand the grazing of cattle.

This is a difficult problem in Australia where the natural tendency, encouraged by tradition and the pecuniary return involved, is to run sheep wherever sheep can be run, but it is one which will have to be faced when desert encroachment, coupled with the demands for an increasing population, compel a conservative agriculture designed for sustained yield rather than the present policy of unconscious exploitation.

### BEEF CATTLE IN AUSTRALIA

The official statistics for the Commonwealth for 1947 give the total for all cattle as 13,426,646 head, of which 3,013,141 are stated to be dairy cattle. This population was distributed as follows:—

New South Wales	22.2%
Victoria	15.3%
Queensland	44.3%
South Australia	3.2%
Western Australia	6.0%
Tasmania	1.6%
Northern Territory	7.3%
Australian Capital Territory	0.1%



Information about the Beef Cattle Industry is contained in "The Australian Environment," pp. 170-175, in "A report on the Conditions of Animal Production in Australia," by John Hammond, Pamphlet No. 79, C.S.I.R.O., in "Zebu-cross Cattle in Northern Australia" by R. B. Kelly, Bul. 172 C.S.I.R.O. and in the annual reports of the Australian Meat Marketing Board.

The following particulars obtained from Pat McCanch, Esq., of Deep Wells Station about a Western Australian cattle property in which he is interested, illustrate the conditions under which much Australian beef is raised:—

Anna Plains Station is on the Coast of Western Australia South of Broome.

The rainfall on the coast, he said, was about 14" per annum and this rainfall decreased by about 1" for every ten miles travelled inland. The total area of Anna Plains is 2,300 square miles and the rent paid to the Crown £300 per annum; of the total area only about 900 square miles are usable. The total stocking is about 15,000 to 20,000; 1,000 to 1,500 bullocks over three years old are sold each year.

These are driven 900 miles along stock routes to Meekatharra Rail Head. This trek includes two 40 mile dry stages, while the rest of the stages are easy day stages. From Meekatharra they are railed a further 300 miles to be sold to fatteners around Geraldton, etc.

### AGRICULTURAL MACHINERY

Australian agriculture has developed a number of machines which are particularly suited to the conditions obtaining in that country. As these conditions find many parallels in Africa, it is considered that many typical Australian implements not yet in general use here, should be introduced.

The use of Stump Jump Disc and Mouldboard Ploughs would effect an immense reduction in the cost of preparing land for cultivation. They will plough very roughly cleared country, jumping high stumps with ease.

At the Hermitage Regional Experiment Station near Warwick in Queensland, I saw a listing attachment for the Sundercut that would be of immense value in Matabeleland and other semi-arid and arid regions in Africa. It was called the Muirhead "Neve-rode" Storm Trap Attachment and was manufactured by Muirhead at Pittsworth.

The one and two row Cane Planters used in Queensland could quite easily be adapted for planting Napier Fodder. They are simple implements that could be manufactured locally.



## 1. AGRICULTURAL RESEARCH IN AUSTRALIA

In Australia, Agriculture is a function of the State Governments; each State maintains its own Department of Agriculture, which is responsible for agricultural administration, education and extension. In addition, the State Departments of Agriculture undertake as much research as their funds and staff will permit.

Most of the more fundamental and long range researches are, however, carried out by the Federal Government through the C.S.I.R.O., which organisation maintains a large research staff in all States and territories.

## 2. THE C.S.I.R.O.

**The Commonwealth Scientific and Industrial Research Organisation** was established on the 19th May, 1949. It took the place of the existing Council for Scientific and Industrial Research which in turn had in 1926 taken the place of the former Institute of Science and Industry.

"The powers and functions of the Organisation . . . include the initiation and carrying out of research in connection with and for the promotion of, primary and secondary industries in the Commonwealth or any Territory of the Commonwealth, or in connection with any matter referred to the Organisation by the Minister; the training of research workers; the making of grants in aid of pure scientific research; the testing and standardisation of scientific apparatus and instruments; . . . the publication of scientific and technical reports and periodicals; and acting as a means of liason with other countries in matters of scientific research."

The Governing body of the Organisation is an executive of five persons and not as formerly a large council.

The Organisation consists of a Head Office in Melbourne and numerous divisions concerned with various branches of research. A very interesting point is that the Head Offices of the Divisions are not centralised in any one capital city, but spread over several; e.g., the Headquarters of the Division of Plant Industry is in Canberra; Animal Health and Production in Melbourne; Biochemistry and General Nutrition in Adelaide.

## ACKNOWLEDGEMENTS

In conclusion I wish to express my gratitude to the Southern Rhodesia Department of Agriculture for sending me to Australia and New Zealand, and to the C.S.I.R.O. in Australia, the Departments of Agriculture in New South Wales and in Queensland and the Department of Scientific and Industrial Research in New Zealand for having done so much for me while I was there.

# Southern Rhodesia Veterinary Report

## REPORTS OF THE FIELD AND RESEARCH BRANCHES FOR THE MONTH OF OCTOBER, 1951

### FIELD BRANCH

**General.**—Spells of cool and hot periods culminated in general rains throughout the country. Falls of from 2 to 10" have been recorded. Rain was mostly of the steady, soaking variety, with days of low overcast skies. Agriculturists took immediate advantage of these conditions, and large areas have already been planted.

**Grazing.**—The showers experienced early, brought forth new grazing, and the subsequent general rains have now stabilised the growth. Cattle are already showing signs of improvement.

**Water.**—Where conservation work is evident, water is now plentiful, but is still short in some areas.

**Tick Life.**—Now becoming increasing evident. In the more favoured areas weekly dipping has been resorted to but there are still areas where dipping has not so far been started owing to water shortage.

**Quarantine Orders:**—Bulawayo 1, Salisbury 3, Fort Victoria 14, Gwelo 2, Umtali 2, Total 22.

### SCHEDULED DISEASES

1. **African Coast Fever.**—Nil.
2. **Theileriosis.**—Nil.
3. **Anthrax.**—One herd of 200 head were inoculated in the Victoria Native district. No centres of infection were confirmed.
4. **Foot and Mouth Disease.**—No further centres of infection were confirmed. Cordons have been steadily reduced and at the end of the month cordons were only retained on Lemoenfontein and Salemore. On Lemoenfontein B it was found that the percentage of reaction to the field virus was greater than previously estimated. The cattle were thrown and evidence of foot reactions noted.
5. **Glanders or Farcy.**—Nil.
6. **Heartwater.**—13 deaths reported from Bulawayo. Fort Victoria reports 1 death and 10 recoveries following the use of Soluprydine intravenously.
7. **Pleuro Pneumonia.**—Nil.
8. **Mange.**—Nil.
9. **Epizootic Lymphangitis.**—Nil.
10. **Piroplasmiasis.**—Bulawayo 1, Salisbury 2, Gwelo 3, Umtali 2, Melsetter 3. Total 11.
11. **Rinderpest.**—Nil.

12 **Swine Fever.**—Nil.

13. **Swine Erysipelas.**—The outbreak on a farm in the Salisbury district now appears to be stamped out.

14. **Quarter Evil.**—Confirmed outbreaks, Bulawayo 2, Salisbury 3, Umtali 1. Total 6.

15. **Tuberculosis.**—(1) Importations: Cattle tested 146. Reactors 3. (2) Exportations: Gwelo 316 tested—6 reactors. (3) Umtali Eradication Scheme. Scheme B, 102 heifers tested, Reactors 19, inconclusive 2. 3 Clinical cases removed from 1 herd. (4) Meat Inspection. Condemned cattle 1 carcase, 5 heads, 2 fores, 2 hinds, 3 pigs.

16. **Scab.**—Nil.

17. **Rabies.**—Bulawayo 3 dogs confirmed, Bubi 1 dog confirmed, Belingwe 1 dog confirmed. Total number of confirmed cases Bulawayo Veterinary District up to 31st October, 1951, 61. Clinicals 113. Dogs vaccinated since campaign started 31,154.

Salisbury Veterinary District—Hartley, confirmed cases 3. Marandellas, confirmed cases 1; Clinicals 1. Total since outbreak 6; Clinicals 4. Dogs vaccinated during October, 1951, 17,395. Dogs vaccinated since outbreak, 21,979.

Fort Victoria—Victoria, confirmed cases 1; Clinicals 1. Total number of confirmed since outbreak 46. Dogs vaccinated in October, 1951, Nil. Total vaccinated since outbreak 8,232.

Gwelo Veterinary District—Gwelo, confirmed cases 1. Charter, confirmed cases 1. Total number of confirmed cases since outbreak 7. Total number of vaccinated dogs 3,228.

Umtali Veterinary District—Umtali, confirmed cases 2. Makoni, confirmed cases 1. Dogs vaccinated in October, 1951, 2,250. Total vaccinated since outbreak 11,778.

Melsetter Veterinary District—Melsetter, confirmed cases 1. Chipinga, confirmed cases 2. Dogs vaccinated during October, 1951, 207. Total vaccinated since outbreak 7,383.

Grand Total of Vaccinated Dogs, 70,526.

**Rabies in Vaccinated Dogs:**

Case No. 1.—Dog vaccinated on 26.7.51, became ill on 30.9.51. Died on 3.10.51. Positive histologically.

Case No. 2.—Dog vaccinated on 26.7.51, sick on 16.10.51. Died 20.10.51. Positive histologically.

The two dogs referred to above belonged to same owner.

Case No. 3.—Dog vaccinated on 26.7.51. Attacked other dogs on 23.10.51. Died 31.10.51. Positive histologically.

All these dogs were inoculated with the same batch of vaccine. The first two were inoculated together at Victoria, the third at Shabani.

18. **Senkobo Skin Disease.**—Nil.

19. **Trypanosomiasis.**—Native Commissioner, Mtoko, reports a mortality of 56 head, from the Mtoko reserve. No further reports.

20. **Contagious Epi-Vaginitis.**—Bulawayo, no further reports, 21 farms still in quarantine. Salisbury, One farm released. 86 farms still in quarantine. Gwelo, One farm released, 8 farms in quarantine. Fort Victoria, Infection confirmed on a ranch in Fort Victoria, at present 16 properties are in quarantine. Total properties in quarantine, 131.

21. **Lumpy Skin Disease.**—Nil.

22. **Contagious Abortion.**—Bulawayo, confirmed on 2 farms. Melsetter, confirmed on 1 farm. Gwelo, confirmed on 1 farm.

### SCHEDULED POULTRY DISEASES

23. **Spirochaetosis.**—Nil.

24. **Coccidiosis.**—Nil.

25. **Fowl Typhoid.**—Nil.

26. **Bacillary White Diarrhoea.**—Bulawayo, 2 flocks tested. (1) 475 birds tested—77 reactors. (2) 128 birds—Negative. Umtali, 1 flock tested, 450 birds, 5 pinpoints. No reactors.

27. **Tuberculosis.**—Nil.

28. **Chicken Pox.**—Nil.

### NON SCHEDULED DISEASES

29. **Anaplasmosis.**—Bulawayo 1, Salisbury 5, Umtali 2. Total 8.

30. **Paratyphoid.**—Nil.

31. **Geilseikite.**—Nil.

32. **Horsesickness.**—Nil.

33. **Biliary Fever (Horses).**—Nil.

34. **Sweating Sickness.**—No Reports.

35. **Ophthalmia.**—No Reports.

36. **Screw Worm.**—Incidence low.

37. **Coccidiosis.**—Nil.

38. (a) **Arsenical Poisoning.**—Bulawayo 1, Salisbury 8, Umtali 5, Melsetter 1. Total 15.

(b) **Lead Poisoning.**— Nil.

(c) **Veld Poisoning.**—Bulawayo 145, Umtali 6, Fort Victoria 1. Total 152.

39. **Ephemeral Fever.**—3 cases reported from Gwelo.

40. **Malignant Catarrhal Fever.**—A mob of Black Wildebeeste entered the country in the South Ndanga district. The result of this invasion, is an outbreak of Malignant Catarrh at Chidumo. At least 50% of the cattle have been infected. No deaths are reported.

**Mallein Testing.**—51 horses were tested all with negative results.

**Tuberculin Testing.**—Importation, 12 bulls, 23 cows and 91 heifers were tested. Exportation, 10 bulls were tested. Miscellaneous, 3 heifers were tested. All above were negative with the exception of 1 heifer and two cows which were positive.

**IMPORTATIONS**

**Union of South Africa.**—16 bulls, 28 cows, 76 heifers, 7 calves, 12 mules, 14 mares, 2 stallions, 8 geldings, 1 goat, 49 pigs, 64 sheep.

**Bechuanaland Protectorate.**—4 goats, 31 pigs, 299 sheep.

**United Kingdom.**—5 bulls.

**EXPORTATIONS**

**Bechuanaland Protectorate.**—160 heifers.

**Belgian Congo.**—11 bulls, 226 heifers, 75 donkeys, 24 horses.

**Northern Rhodesia.**—2 bulls, 288 cows, 204 heifers, 6 pigs.

**Nyasaland.**—1 bull, 12 pigs.

**Union of South Africa.**—1 horse.

**EXPORTATION MISCELLANEOUS**

**Union of South Africa.**—Sausage casings 6,748 lbs.

**Portuguese East Africa.**—Sausage casings 13,312 lbs.

**United Kingdom.**—Picnic Hams 17,400 lbs, cooked shoulders 36,072 lbs., steak and kidney (tins) 12,000 lbs., gammons 24,420 lbs.

**Northern Rhodesia.**—Three-quarter Sides 3,226 lbs., Middles 5,727 lbs., York Hams 207 lbs., Gammons 886 lbs., Picnic Hams 86 lbs., Cooked shoulders 3,108 lbs., Sliced bacon 511 lbs., Cooked gammons 829 lbs., Smalls 2,846 lbs.

**Bechuanaland Protectorate.**—Middles 125 lbs., York Hams 40 lbs., Picnic Hams 14 lbs., Cooked shoulders 133 lbs., Sliced bacon 250 lbs., Smalls 494 lbs.

**Meat Products from Liebegs (Rhodesia) Ltd., West Nicholson.**

**Union of South Africa.**—Corned beef 167,400 lbs., Ox brisket 3,600 lbs., Oxford sausages 13,500 lbs., Vienna sausages 27,000 lbs., (24/10 oz.) Vienna sausages (48/4 oz.) 96 lbs., Ham and Tongue roll 6,300 lbs., Steak and Kidney 9,600 lbs., Braised Steak 9,600 lbs., Braised Steak and Onions 30,000 lbs., Braised Liver 4,872 lbs., Oxtail in Jelly 1,213 lbs., Curried beef 33,600 lbs., Potted Meat 7,461 lbs., Assorted Meat Paste, Nil.

**Belgian Congo.**—Corned Beef 37,800 lbs., Vienna Sausages 75 lbs.

**Portuguese East Africa.**—Corned beef 36 lbs., Ox Tongue 12 lbs., Ox brisket 12 lbs., Oxford sausages 22½ lbs., Vienna sausages (24/10 oz.) 15 lbs., Ham and Tongue roll 15¾ lbs., Braised Steak and Veg. 24 lbs., Steak and Kidney 24 lbs., Braised Steak and Onions 24 lbs., Braised Liver 29,112 lbs., Oxtail in Jelly 21 lbs., Curried beef 24 lbs., Assorted Meat Paste 8¼ lbs.

**RESEARCH BRANCH**

**Material Submitted for Diagnosis.**—Smears 670, Specimens 33, Poultry post mortems 35, other post mortems 6 pigs, 1 sheep, 1 dog.



**SCHEDULED DISEASES**

- (1) **African Coast Fever.**—Nil.
- (2) **Theileriosis.**—Nil.
- (3) **Anthrax.**—Nil.
- (4) **Foot and Mouth Disease.**—Nil.
- (5) **Glanders.**—Nil.
- (6) **Heartwater.**—Nil.
- (7) **Pleuropneumonia.**—Nil.
- (8) **Mange.**—Nil.
- (9) **Epizootic Lymphangitis.**—Nil.
- (10) **Piroplasmosis.**—4 cases (202 smears examined from animals inoculated with Redwater and Gallsickness vaccine.
- (11) **Rinderpest.**—Nil.
- (12) **Swine Fever.**—Nil.
- (13) **Swine Erysipelas.**—Nil.
- (14) **Quarter Evil.**—2 cases.
- (15) **Tuberculosis.**—Submaxillary glands of pig submitted by Chief Meat Inspector for biological test. 1,200 doses Avian and Mammalian Tuberculin supplied to Field Staff.
- (16) **Scab.**—Nil.
- (17) **Rabies.**—Specimens submitted 36, Positive histologicals 17, Biologicals undertaken 8, Positive biologicals 4.
- (18) **Senkobo Disease.**—Nil.
- (19) **Trypanosomiasis.**—Nil.
- (20) **Epi Vag.**—Transmission experiments on Epi Vag station continuing.
- (21) **Lumpy Skin Disease.**—Nil.
- (22) **Contagious Abortion.**—237 samples examined showing 21 positive samples thus confirming disease on 5 premises. One animal imported from the United Kingdom aborted in the quarantine stables and gave a positive blood test.

**POULTRY DISEASES**

- (23) **Spirochaetosis.**—Nil.
- (24) **Coccidiosis.**—11 cases were diagnosed on a total of 6 premises.
- (25) **Fowl Typhoid.**—Confirmed on 1 farm.
- (26) **Bacillary White Diarrhoea.**—Confirmed on 1 set of premises in adult birds.
- (27) **Tuberculosis.**—Nil.
- (28) **Chicken Pox.**—Nil.  
**Roup.**—2 cases confirmed.

**NON SCHEDULED DISEASES**

(29) **Anaplasmosis.**—2 cases confirmed (202 smears examined from animals inoculated with Redwater and Gallsickness vaccine).

(30) **Paratyphoid.**—Nil.

(31) **Geilseikte.**—Nil.

(32) **Horsesickness.**—Nil.

(33) **Sweating Sickness.**—Nil.

(34) **Biliary Fever.**—Nil.

(35) **Ophthalmia.**—Nil.

(36) **Nyiasis.**—Nil.

(37) **Coccidiosis.**—1 case.

(38) **Poisoning—Arsenic.**—2 cases.  
**Veld.**—1 case.

(39) **Internal Parasitis.**—Nil.

(40) **Measles.**—Nil.

(41) **Mastitis.**—4 milk samples were submitted for examination, 1 showed streptococcal infection.

(42) **Non scheduled poultry diseases and conditions:**—Lymphomations tumours 4, Internal parasites 1, Enteritis 5, Egg peritonitis 4.

**ARTIFICIAL INSEMINATION**

A total of 23 doses of semen were distributed during the month as follows.—Used on Research Station, 7 doses; supplied direct to farmers, 8 doses; used by inseminator on farms and plots, 8 doses.

**VACCINES AND REMEDIES ISSUED**

Quarter Evil Vaccine, 14,990 doses; Chicken Pox Vaccine, 23,900 doses; Chicken Pox Vaccine (Kenya) 5,000 doses; Horse Sickness Vaccine 935 doses; Redwater and Gallsickness Vaccine, 62 doses; Fowl typhoid Vaccine, 213 doses; Calf Paratyphoid Vaccine, 420 doses; Contagious Abortion Vaccine, 192 doses; Blue Tongue Vaccine 550 doses.

**REMEDIES, ETC.**

Nodular Worm remedy, 128 tins; Spoons and dosing bowls, 1 set; Tetram, 10 gallons; Dosing syringes, 2; Blow fly spray, 11 gallons; Carbon Tetrachloride, 1 lb.

**REDWATER AND GALLSICKNESS VACCINATION IN  
LABORATORY STABLES**

Animals received for vaccination: Ex United Kingdom Nil, ex Union of South Africa 6 bulls 13 cows or heifers, ex Rhodesia 1 bull.

Animals released following vaccination: Ex United Kingdom 3 bulls 39 cows or heifers, ex Union of South Africa 1 bull 10 cows or heifers, ex Rhodesia Nil.

J. S. ADAMSON,  
DIRECTOR OF VETERINARY SERVICES.

**FIELD BRANCH.—NOVEMBER, 1951.**

**General.**—General set-in rains were recorded all over the Colony, falls of 2 inches to 8 inches being recorded. The rains were mostly of a soaking variety of great benefit, with no damage to dams or crops. The latter part of the month was dry. Ploughing and planting has been completed in most districts and crops are looking well.

**Grazing.**—Grazing and water are plentiful.

**Stock.**—The general condition of stock has improved greatly. A low mortality has been reported from one area, where mud conditions prevail amongst old low-conditioned cows.

**Tick Life.**—Tick life at present is extremely active, and it is anticipated will cause a considerable amount of trouble later. Owing to the shortage of petrol, inspections under the Cattle Cleansing Act ceased, with the exception of the Melssetter, Chipinga and Charter Native Districts. The tick life position is by no means proportionate to the limited number of quarantine orders given below.

Quarantine Orders: Bulawayo 9, Salisbury 9, Fort Victoria 26, Gwelo 2, Umtali 5; Total 51.

**SCHEDULED DISEASES.**

1. **African Coast Fever.**—Nil.
2. **Theileriosis.**—Nil.
3. **Anthrax.**—Nil.
4. **Foot and Mouth Disease.**—All quarantine restrictions removed.
5. **Glanders or Farcy.**—Nil.
6. **Heartwater.**—8 deaths reported from Bulalima-Mangwe and Gwanda, Victoria 1, Chipinga 1 death and 5 recoveries. Bont ticks are reported to be very active, and cattle owners are adding B.H.C. compounds to the arsenical washes in order to keep the infestation in check.
7. **Pleuro Pneumonia.**—Nil.
8. **Mange.**—Nil.
9. **Epizootic Lymphangitis.**—Nil.
10. **Piroplasmosis.**—Bulawayo 3, Salisbury 2, Fort Victoria 1, Gwelo 1, Umtali 2; Total 9.
11. **Rinderpest.**—Nil.
12. **Swine Fever.**—Nil.
13. **Swine Erysipelas.**—One case confirmed in the Melssetter District.
14. **Quarter Evil.**—Bulawayo 2, Salisbury 1, Fort Victoria 2, Gwelo 1, Umtali 1; Total outbreaks 7.
15. **Tuberculosis.**—
  1. **Importations:** Cattle tested 75, Reactors 1.
  2. **Exportations:** Nil.

**3. Umtali Eradication Scheme:**

**A. Scheme:** 16 head were tuberculin tested for addition to four farms under Scheme A, 15 passed and 1 reacted.

**B. Scheme:** 17 tested, 16 passed, 1 inconclusive.

**Voluntary Scheme, Umtali:** 2 herds comprising 250 head tested, 199 passed, 39 reactors and 12 inconclusive.

**Voluntary Scheme, Bulawayo:** 3 herds tested, comprising 332 head, 288 passed, 1 reactor and 43 inconclusive.

**Voluntary Scheme, Salisbury:** 6 head tested and passed.

16. **Scab.**—Nil.

17. **Rabies.**—

**Bulawayo Veterinary District:** Insiza—1 dog confirmed; Bulalima-Mangwe—1 dog confirmed, 1 clinical stray. Total number of confirmed cases Bulawayo Veterinary District 63; Clinicals 114. Dogs inoculated during November 6,848; dogs inoculated since outbreak 38,002.

**Salisbury Veterinary District:** Hartley—2 confirmed cases; Marandellas—3 confirmed cases; Mrewa—1 confirmed case. Total confirmed since outbreak 12; Clinicals 5. Dogs inoculated during November 7,451; dogs inoculated since outbreak 29,431.

**Fort Victoria Veterinary District:** Chibi—1 confirmed case; Bikita—1 confirmed case. Total number of dogs confirmed 66. Dogs inoculated during November 435; dogs inoculated since outbreak 8,667.

**Gwelo Veterinary District:** Gwelo—3 confirmed cases; Chilimanzi—2 confirmed cases. Total number of dogs confirmed 12. Dogs inoculated during November 3,981; dogs inoculated since outbreak 7,209.

**Umtali Veterinary District:** Umtali—3 dogs confirmed. Total number of confirmed cases 12. Dogs inoculated during November 7,870; dogs inoculated since outbreak 19,058.

**Melsetter Veterinary District:** Chipinga—4 dogs confirmed. Total number of confirmed cases 18; clinicals 5. Dogs inoculated during November 82; dogs inoculated since outbreak 7,465.

Grand total of confirmed cases of Rabies 183.

Grand total of inoculated dogs 109,832.

**Rabies in Inoculated Dogs.**—Dog attacked by a rabid dog on April 27, 1951; the wounds were cauterised. The dog was inoculated on August 14, 1951, and was destroyed on November 14, 1951, and confirmed as rabid histologically.

18. **Senkobo Skin Disease.**—Nil.

19. **Trypanosomiasis.**—All cattle in the Mkoto (3,269) and Chikwizo (1,839) Native Reserves were block inoculated with Dimidium Bromide. The death rate in Mkoto since October 1, 1951, was 144 head, and Chikwizo 14 head.

In the former the percentage of infection was 16.71 and in the latter 5.53.

In the Mkoto Reserve the disease position is extremely unsatisfactory.

In an effort to destroy adult tsetse, hand spray pumps have been obtained, and cattle are to be sprayed with a Benzene Hexachloride mixture.

At present the disease position in the Urungwe Reserve is satisfactory.

In the Genorerezhan Game Reserve 16 deaths have been recorded.

All cattle have been inoculated with dimidium bromide.

20. **Contagious Epididymitis and Vaginitis.**—

**Bulawayo:** 4 heifers of a consignment of 15 imported from South Africa were found to be infected at the quarantine yards, Bulawayo. No further infection was detected; in all 21 farms are in quarantine.

**Salisbury:** No change. 86 farms in quarantine.

**Gwelo:** No change. 8 farms in quarantine.

**Fort Victoria:** No change. 16 farms in quarantine.

**Total properties in quarantine** 131.

21. **Lumpy Skin Disease.**—Reported from Que Que and Plumtree.

22. **Contagious Abortion.**—Salisbury: Confirmed on 3 farms. Melsetter: Confirmed on 1 farm.

#### **SCHEDULED POULTRY DISEASES.**

23. **Spirochaetosis.**—Nil.

24. **Coccidiosis.**—Nil.

25. **Fowl Typhoid.**—Nil.

26. **Bacillary White Diarrhoea.**—No tests.

27. **Tuberculosis.**—Nil.

28. **Roup.**—Severe outbreak on one farm in Fort Victoria causing a 60 per cent. mortality.

#### **NON-SCHEDULED DISEASES.**

29. **Anaplasmosis.**—Bulawayo 2, Salisbury 2, Melsetter 2; Total 6.

30. **Paratyphoid.**—Nil.

31. **Geilsiekte.**—Salisbury 4 cases.

32. **Horsesickness.**—Nil.

33. **Biliary Fever (Horses).**—Marandellas 1 case.



- 34. **Sweating Sickness.**—Nil.
- 35. **Ophthalmia.**—Incidence low.
- 36. **Screw Worm.**—Incidence low.
- 37. **Coccidiosis.**—Nil.
- 38. **Poisoning.**—

**Mineral: Arsenic**—Bulawayo 8, Salisbury 7, Gwelo 58;  
Total 73. **Phosphate**—7 pigs Melsetter District.

**Vegetable:** Bulawayo 5, Salisbury 2, Fort Victoria 2;  
Total 9.

- 39. **Ephemeral Fever.**—Nil.

40. **Malignant Catarrhal Fever.**—Following the outbreak at Chidumo, which was introduced by Black Wildebeeste, infection has now been confirmed on Magudas and Nuanetsi Ranch. No mortality has been reported.

**Mallein Testing.**—15 mares, 4 stallions, 23 geldings tested. All negative.

**Tuberculin Testing.**—

**Importations:** 2 bulls, 21 cows, 47 heifers, 5 calves tested. With the exception of 1 cow, all were negative.

**Exportations:** Nil.

**Miscellaneous:** 10 bulls, 179 cows, 79 heifers, 64 calves were tested. All negative with the exception of 1.

### IMPORTATIONS.

**Union of South Africa.**—2 bulls, 21 cows, 47 heifers, 5 calves, 13 mares, 4 stallions, 23 geldings, and 1 sheep.

**United Kingdom.**—2 mares.

**Bechuanaland.**—25 goats, 316 sheep, 73 mixed cattle.

### EXPORTATIONS.

**Belgian Congo.**—2 bulls, 127 heifers, 99 donkeys.

**Northern Rhodesia.**—4 bulls, 210 heifers, 12 donkeys.

**Nyasaland.**—3 calves, 32 pigs.

### EXPORTATIONS—MISCELLANEOUS.

**Union of South Africa.**—468 lbs. ox gall, 19,621 lbs. sausage casings.

**Portuguese East Africa.**—8,970 lbs. neetsfoot oil, 9,082 lbs. screws and Pizzles.

**United Kingdom.**—56,112 lbs. bacon shoulders, 22,044 lbs. gammons, 24,000 lbs. steak and kidney.

**Northern Rhodesia.**—2,420 lbs. three-quarter sides, 7,116 lbs. middles, 1,459 lbs. York hams, 1,373 lbs. gammons, 508 lbs. picnic hams, 2,526 lbs. cooked shoulders, 405 lbs. sliced bacon, 603 lbs. cooked gammons, 2,024 lbs. smalls.

**Bechuanaland.**—76 lbs. gammons, 168 lbs. picnic hams, 85 lbs. cooked shoulders, 220 lbs. sliced bacon, 11 lbs. cooked gammons, 457 lbs. smalls.

**Meat Products from Liebigs (Rhodesia) Ltd., West Nicholson.**

**Union of South Africa.**—279,072 lbs. corned beef, 393½ lbs. Cannox stewed beef, 900 lbs. potted meat.

J. S. ADAMSON,  
Director of Veterinary Services.

### VETERINARY RESEARCH—NOVEMBER, 1951.

During the month of November the following materials have been submitted to the Laboratory for diagnosis: Smears 1,181; Specimens 28; Poultry post mortems 50; Other post mortems 3 bovines, 6 sheep, 6 pigs.

### SCHEDULED DISEASES.

**Piroplasmosis.**—2 cases of Redwater were confirmed on two farms. (30 slides were examined from animals inoculated with Redwater and Gallsickness vaccine.)

**Quarter Evil.**—4 cases were confirmed on four premises.

**Tuberculosis.**—Nil. No. of doses of Tuberculin issued to Field Staff: 1,750 Mammalian, 1,650 Avian.

**Rabies.**—Specimens submitted 37; Positive histologicals 19; Negative histological sent for biological 11; Positive biologicals Nil.

**Trypanosomiasis.**—Smears submitted for examination 470; Positive for T. Congo 145; Positive for T. Vivax 4.

**Contagious Abortion.**—Blood samples submitted 110; Positives 18; No. of premises involved 7.

### SCHEDULED POULTRY DISEASES.

**Spirochaetosis.**—1 case.

**Coccidiosis.**—10 cases involving five premises.

**Bacillary White Diarrhoea.**—2 cases confirmed, 1 in chicks and 1 in adults, both originating from known positive sources.

**Roup.**—2 cases.

### NON-SCHEDULED DISEASES (Large Animals).

**Anaplasmosis.**—4 cases involving four premises. (30 slides examined from animals inoculated with Redwater and Gallsickness vaccine.)

**Biliary Fever.**—1 equine, 2 canine cases. (Such cases do not normally come to the Laboratory, but the diagnoses were made from smears sent in.)

**Coccidiosis.**—2 cases involving one set of premises.

**Poisoning.**—

**Arsenic:** 2 cases involving two premises (in one of these cases 48 cattle were lost; owing to an inefficient dip testing outfit dip was used at four times the weekly dipping strength).

**Veld:** 1 case. This owner has previously had similar losses last year, but this year owing to earlier rains we were able to definitely identify the cause as *Urginea burkei* (slangkop). As the spread is comparatively slow, owner is digging up the majority of these plants which are found in two of his paddocks.

**Internal Parasites.**—2 cases.

## NON-SCHEDULED POULTRY DISEASES AND CONDITIONS.

**Lymphomatous Tumours.**—6.

**Internal Parasites.**—Nil.

**Enteritis.**—10.

**Egg Peritonitis.**—5.

## ARTIFICIAL INSEMINATION.

A total of 31 doses of semen were distributed during the month as follows: Used in Research Station 6 doses; Supplied direct to farmers 9 doses; Used by inseminator on farms and plots 16 doses.

## VACCINES AND REMEDIES ISSUED.

Quarter Evil Vaccine 9,300 doses; Chicken Pox Vaccine 19,600 doses; Horse Sickness Vaccine 649 doses; Redwater and Gallsickness Vaccine 15 doses; Fowl Typhoid Vaccine 88 doses; Calf Paratyphoid Vaccine 495 doses; Contagious Abortion Vaccine 645 doses; Blue Tongue Vaccine 40 doses.

## REMEDIES, ETC.

Nodular Worm Remedy 149 tins; Spoons 11 sets and 13 singles; Dosing Bowls 4; Tetram 5 gallons; Blow Fly Spray 5 gallons; Dimidium Bromide 30 doses.

## REDWATER AND GALLSICKNESS INOCULATION IN LABORATORY STABLES.

Animals received for inoculation:

	Bulls.	Cows or Heifers.
ex United Kingdom	Nil	Nil
ex Union of South Africa	„	3
ex Rhodesia	1	6

Animals released following inoculation:

ex United Kingdom	3	Nil
ex Union of South Africa	Nil	„
ex Rhodesia	2	„

J. S. ADAMSON,  
Director of Veterinary Services.

## RHODESIAN MILK RECORDS

## OFFICIAL MILK RECORDS

Name of Cow.	Breed.	Age.	Milk in lbs.	B. Fat in lbs.	Average Percentage B. Fat.	No. of Days.	Name and Address of Owner.
Dirko Jong Klinker II.....	Friesland.....	Jun. 4 years	8999 00	295 86	3 29	300	Bradley Bros., P.O. Box 699, Bulawayo.
Dirko Jong Kort Ruiter....	Friesland.....	2 years	8093 00	321 50	3 97	300	
Dirko Jong Paddy III.....	Friesland.....	Jun. 4 years	12125 00	423 90	3 49	300	
Acquanetta.....	Jersey.....	Sen. 3 years	3989 00	182 08	4 56	300	M. W. Burras, P.O. Box 443, Bulawayo.
Abbotsford Brakfontein Bleske.....	Friesland.....	Sen. 3 years	8192 00	305 27	3 73	300	E. Butler, Woodlands, P.O. Shamva.
Kilprug Bertus Eclat.....	Friesland.....	Mature	5515 00	194 40	3 52	300	Engelbrecht & Son, P.O. Box 13, Que Que.
Schoongezicht Shasta II...	Jersey.....	Sen. 4 years	3398 20	172 38	5 07	251	W. T. E. Fitzsimons, Mayfair Farm, P.O. Melfort.
*Kingswood Dieukmar Famous.....	Friesland.....	2 years	10626 50 12053 00	376 90 434 95	3 55 3 61	300 365	Frogmore Estates, Ltd., P.O. M'Sonneddi.
*Kingswood Dieukmar Kestrel IV.....	Friesland.....	2 years	10957 00	376 26	3 43	300	Mrs. H. D. Gamble, P.O. Box 1629, Salisbury.
Kingswood Marius Daisy..	Friesland.....	2 years	8075 00	302 52	3 75	300	
Roodbloem Gwen V.....	Friesland.....	2 years	5409 00	171 37	3 17	300	
Roodbloem Linda Bom....	Friesland.....	2 years	5322 00	187 24	3 52	300	
Roodbloem Voorste	Friesland.....	2 years	3520 00	123 96	3 50	300	
Maggie.....	Friesland.....	2 years	4262 50	151 80	3 56	300	
Roodbloem Voorste Poppy	Friesland.....	2 years	173 31	173 31	4 59	300	F. Gebbie, P. Bag 42, Marandellas.
Fanny's Princess Elizabeth	Guernsey.....	Sen. 3 years	5973 00	251 01	4 22	300	
of Wanganelia.....	Guernsey.....	2 years	4622 00	247 31	5 35	300	
Lucky's Cordial of Wanga- nelia.....	Guernsey.....	2 years	4746 00	270 57	5 68	249	
Valeries Jewel of Wanga- nelia.....	Jersey.....	Sen. 4 years					
Athole Dischord.....							

Dalham Isabella.....	Jersey.....	Mature	8734-00	392-06	4-49	300	S. Gelman, 27 Baxendale Street, Bulawayo.
Dalham Lena.....	Jersey.....	Mature	11202-50	540-51	4-82	300	
Dalham Rosaline.....	Jersey.....	Mature	7992-00	400-96	5-02	300	
Dalham Theresa.....	Jersey.....	Mature	6865-00	338-45	4-93	300	
Matopo Berroll.....	Red Poll.....	Jun. 3 years	4296-20	184-84	4-30	260	The Superintendent, Government Experimental Station, P. Bag 19K, Bulawayo.
Matopo Sunbeam.....	Red Poll.....	Mature	5600-60	184-07	3-29	300	
Matopo Toss.....	Red Poll.....	Mature	7196-20	294-76	4-10	300	
Matopo Valencia.....	Red Poll.....	Mature	8678-90	335-40	3-87	300	
Matopo Venetia.....	Red Poll.....	Mature	8913-20	355-91	3-99	300	E. J. Hards, P.O. Box 61, Marandellas.
Constance of Churchill.....	Guernsey.....	Jun. 3 years	5584-00	264-08	4-73	300	
Elizabeth of Churchill.....	Guernsey.....	Jun. 3 years	4109-50	179-99	4-38	275	
Miss Drew III Anemone of Waganelia.....	Guernsey.....	Mature	7423-00	298-31	4-02	300	
Molly's Lady Moore of Waganelia.....	Guernsey.....	Mature	7121-00	299-04	4-20	300	Home Park Estates, Ltd., P.O. Machéke.
White Ladies Kate II.....	Guernsey.....	Sen. 3 years	4108-00	195-69	4-76	254	
Rhebokskraal Kanarie.....	Jersey.....	Mature	6680-50	294-90	4-41	300	
Criterion Eerste II.....	Friesland.....	Sen. 4 years	13519-00	492-17	3-64	300	
Criterion Jantje II.....	Friesland.....	Jun. 3 years	7558-00	258-97	3-43	300	J. Jamieson, P.O. Box 217, Bulawayo.
Malangskraal Napoleon Maatie VIII.....	Friesland.....	2 years	13216-00	542-50	4-10	299	
Checkmates Glowworm.....	Jersey.....	Mature	4141-00	204-84	4-95	300	
Katinka Nancy.....	Jersey.....	Mature	5247-00	250-55	4-78	300	
Meadows Ophelia.....	Jersey.....	Mature	4424-00	293-17	6-62	300	J. H. Keightley, Moorfields, Glendale.
Meadows Pioneer Wallflower.....	Jersey.....	Mature	6045-00	343-05	5-68	300	
M'Sasa Loraine.....	Jersey.....	Jun. 3 years	4281-50	246-12	5-75	300	
Minhnick Gay.....	Friesland.....	17 months	4831-00	179-21	3-71	294	
Minhnick Rivulet.....	Friesland.....	2 years	4858-00	158-19	3-75	264	Thos. Meikle Trust and Investment Co., Leachdale, P.O. Shangani.
Minhnick Violone.....	Friesland.....	Jun. 3 years	7221-00	299-67	4-15	300	
Leachdale Bactrina.....	Friesland.....	Mature	5227-00	182-31	3-49	300	
Leachdale Evoor.....	Friesland.....	Jun. 3 years	3857-00	146-11	3-79	256	
Dirko Jong Kapok.....	Friesland.....	Sen. 3 years	10414-00	389-98	3-74	300	A. L. Millar, P.B. 28A, Salisbury.
Dirko Klein Boumlele.....	Friesland.....	Sen. 4 years	10408-50	340-96	3-28	300	

• Milked three times daily.



## OFFICIAL MILK RECORDS—(continued)

Name of Cow.	Breed.	Age.	Milk in lbs.	B. Fat in lbs.	Average Percentage B. Fat.	No. of Days.	Name and Address of Owner.
Brakfontein Witkwas XIX.	Friesland.	Mature	7317-00	241-65	3-30	300	K. Norvall, P.O. Box 637, Bulawayo.
Exwell Betty I.	Friesland.	Mature	8202-00	292-45	3-57	300	
Exwell Marie III.	Friesland.	Mature	8995-00	329-30	3-77	300	
Minhinick Parida.	Friesland.	Mature	7534-00	237-80	3-15	300	
Minhinick Urchin.	Friesland.	Jun. 4 years	9189-00	321-01	3-49	300	
Minhinick Utgard.	Friesland.	Sen. 3 years	8822-00	295-45	3-35	300	Mrs. E. L. Parkes, P.O. Box 159, Salisbury.
Mitchlin Dainty A. I's	Friesland.	Sen. 4 years	6973-00	247-37	3-55	300	
Andora.	Friesland.	2 years	4179-00	132-91	3-18	300	
Seaborough Kate.	Friesland.						
Middledam Prim Jolly Girl (Sold).	Jersey.	Mature	3961-00	215-24	5-43	270	
Siebrhagen Huysrou.	Friesland.	Jun. 3 years	11406-00	371-25	3-25	300	J. D. Parsons, P.O. Box 7, Bulawayo.
Siebrhagen Kafermald.	Friesland.	2 years	11268-00	360-38	3-19	300	
Alice of Nengwa.	Guernsey.	Mature	4071-50	171-69	4-22	244	E. J. Quinton, P. Bag 16A, Salisbury.
Whinburn Balm.	Friesland.	Mature	10484-65	382-72	3-65	290	G. Richards, Littledick Farm, P.O. Macheke.
Albertvale Andre.	Friesland.	Sen. 3 years	10448-50	459-46	4-40	300	G. W. Robinson, P.O. Box 346, Salisbury.
Mitchlin Anethyst.	Friesland.	Sen. 3 years	6428-20	183-22	2-85	300	B. Schernbrucker, P.O. Box 402, Bulawayo.
Whinburn Aconite.	Friesland.	Mature	13012-40	456-05	3-50	300	Major R. R. Sharp, P. Bag 68L, Bulawayo.
Whinburn Angela.	Friesland.	Mature	13163-30	448-45	3-38	300	
Whinburn Betty.	Friesland.	Mature	9729-40	345-31	3-55	300	
Whinburn Chalice.	Friesland.	Sen. 4 years	8490-00	303-45	3-57	300	
Whinburn Clove.	Friesland.	Mature	6478-40	265-79	4-10	300	
Whinburn Daffodil.	Friesland.	Mature	12642-00	475-83	3-76	300	
Whinburn Daisy.	Friesland.	Sen. 4 years	6452-20	226-28	3-51	300	
Whinburn Destiny.	Friesland.	Jun. 4 years	7012-40	237-55	3-39	300	
Whinburn Elin.	Friesland.	Sen. 4 years	8664-40	307-18	3-55	300	
Whinburn Emblem.	Friesland.	Sen. 3 years	8716-10	307-54	3-45	300	
Whinburn Sage.	Friesland.	Mature	12279-30	429-48	3-50	300	

Gledsmuir March Rose....	Jersey.....	2 years	6050-00	373-41	6-19	300	J. R. Shaw, Mashonganyika Farm, P.O. Ruwa.
Gledsmuir Victory Sarah...	Jersey.....	2 years	5811-00	352-73	6-07	300	
Wonderful Aim's Noblesse.	Jersey.....	Mature	7553-00	400-21	5-30	300	
Barlow's Vergelegen	Jersey.....	2 years	6107-30	316-43	5-18	300	W. Smith Baillie, P. Bag 43, Marandellas.
Mignon (Sold).....	Jersey.....	2 years	4207-00	272-19	6-49	284	
Bovey Saucy Sal.....	Jersey.....	Mature	5442-00	289-33	5-32	266	
Gledsmuir Mayfire.....	Jersey.....	Mature	5315-00	216-79	4-08	300	C. G. Tracey, P. Bag 15, Gatooma.
Gledsmuir Rowers Mig- nonne.....	Jersey.....	—	7323-00	363-07	4-96	290	
Gledsmuir Marie.....	Jersey.....	—					M. Tracey, P.B. 21, Gatooma.

• Milked three times daily.

## SEMI-OFFICIAL MILK RECORDS

Name of Cow.	Breed.	Age.	Milk in lbs.	B. Fat in lbs.	Average Percentage B. Fat.	No. of Days.	Name and Address of Owner.
Clara (Dead).....	G. Friesland.....	3 years	8894-00	274-07	3-08	278	Ashby Bros., P. Bag 24, Gwelo.
Judy.....	G. Friesland.....	Mature	5970-50	229-38	3-84	300	
Nancy.....	G. Friesland.....	4 years	6936-00	261-39	3-77	300	
Patience.....	G. Friesland.....	4 years	10215-50	345-38	3-35	300	
Goop I.....	G. Friesland.....	Mature	7382-00	247-32	3-35	300	H. J. Baker, Cotter, P.O. Marandellas.
Bandidi.....	G. Friesland.....	Mature	10594-00	320-28	3-02	300	R. A. Ballantyne, P.O. Box 801, Salisbury.
Barbara.....	G. Friesland.....	Mature	8844-00	326-25	4-02	300	
Donaghadee.....	G. Friesland.....	Mature	8608-00	282-28	3-28	300	
White.....	G. Friesland.....	Mature	7688-00	255-08	3-32	282	
D 121.....	G. Friesland.....	Mature	9570-90	349-56	3-65	300	A. L. Bickle, P.O. Box 595, Bulawayo.
D 207.....	G. Friesland.....	Mature	8761-00	280-08	3-21	300	
D 246.....	G. Friesland.....	4 years	9564-60	350-88	3-67	300	
D 270.....	G. Friesland.....	3 years	10506-50	342-52	3-26	300	
Grove Park Ann.....	G. Friesland.....	Mature	7930-00	258-44	3-38	300	Bradley Bros., P.O. Box 699, Bulawayo.
Grove Park Frieder.....	G. Friesland.....	4 years	11020-00	353-07	3-20	300	
Grove Park Julie.....	G. Friesland.....	Mature	11668-00	364-65	3-12	300	
Grove Park Lily.....	G. Friesland.....	Mature	10568-00	351-91	3-33	300	
Scarlet.....	G. Friesland.....	2 years	5632-50	241-39	4-29	280	Col. P. A. Brooke, P.O. Box 1690, Salisbury.
No. 3.....	G. Ayrshire.....	3 years	5962-70	273-01	4-58	300	
No. 19.....	G. Friesland.....	2 years	6401-30	256-93	4-01	300	
J 2.....	G. Ayrshire.....	4 years	8966-50	326-20	3-64	300	
J 3.....	G. Friesland.....	4 years	6707-00	260-76	3-89	300	Brucehame Dairy, P.O. Box 145, Fort Victoria.
No. 25.....	G. Friesland.....	Mature	6679-50	280-85	4-20	300	
No. 43.....	G. Friesland.....	3 years	8439-00	279-49	3-31	268	
No. 54.....	G. Friesland.....	Mature	6661-00	262-20	3-96	285	
No. 73.....	G. Common.....	Mature	6450-00	248-54	3-85	231	
No. 78.....	G. Friesland.....	Mature	6405-00	240-15	3-75	300	
Nora.....	G. Ayrshire.....	3 years	6080-50	252-49	4-10	300	

Clementine.....	G. Friesland.....	2 years	9421-50	373-17	3-96	300	Mrs. L. J. Clarke, Kingston Dalry, Gwelo.
Daisy.....	G. Friesland.....	4 years	10518-00	436-38	4-15	265	
Dolly.....	G. Friesland.....	3 years	10437-50	405-60	3-89	300	
Doreen.....	G. Friesland.....	2 years	7709-00	313-38	4-07	300	
Midjet.....	G. Friesland.....	Mature	8577-00	342-86	4-00	300	
Molly.....	G. Aysire.....	3 years	9943-00	400-25	4-03	300	
Mosquito.....	G. Friesland.....	Mature	11777-50	451-26	3-83	261	
Pixie.....	G. Friesland.....	2 years	6219-50	257-43	4-14	300	
Star.....	G. Friesland.....	Mature	10437-50	426-41	4-09	300	
Sunny.....	G. Friesland.....	2 years	7650-00	247-79	3-24	300	R. Creeth, Cheverton, P.O. Marandellas.
No. 28.....	G. Friesland.....	Mature	9674-00	361-29	3-73	300	
No. 23.....	G. Friesland.....	Mature	13050-00	438-55	3-36	300	
No. 27.....	G. Friesland.....	Mature	9520-00	299-67	3-16	300	T. W. V. Cross & Son, P. Bag T 208, Bulawayo.
No. 35.....	G. Friesland.....	Mature	11709-00	422-78	3-61	300	
No. 36.....	G. Friesland.....	Mature	9624-00	320-89	3-33	256	
No. 94.....	G. Friesland.....	Mature	10369-00	325-78	3-14	300	
No. 97.....	G. Friesland.....	Mature	7728-00	261-68	3-38	277	
No. 112.....	G. Friesland.....	4 years	9196-00	301-04	3-27	296	
No. 113.....	G. Friesland.....	4 years	11672-00	322-79	3-62	300	J. V. Danckwerts, P.O. Box 989, Salisbury.
No. 135.....	G. Friesland.....	4 years	6934-00	264-96	3-82	300	
No. 127.....	G. Friesland.....	3 years	7778-70	299-28	3-85	300	
Audrey.....	G. Friesland.....	Mature	9031-90	373-89	4-14	300	
Blancie.....	G. Friesland.....	Mature	7508-20	280-32	3-73	235	
Bunga Bunga.....	G. Friesland.....	Mature	10062-70	336-37	3-34	300	
Vivian.....	G. Friesland.....	Mature	6531-50	232-05	3-55	270	L. Dando, c/o 17 Jamieson Street, Bulawayo.
Bunch.....	G. Friesland.....	Mature	5679-50	231-99	4-08	276	
Diana.....	G. Jersey.....	Mature	6290-00	233-97	3-72	273	
Joy.....	G. Jersey.....	4 years	7566-20	310-44	4-10	300	B. St. J. D. Downs, Safago Farm, P.O. Gwelo.
No. 423.....	G. Guernsey.....	Mature	6086-60	235-24	3-86	300	
No. 466.....	G. Guernsey.....	Mature	7764-40	257-15	3-31	258	
Agnes.....	G. Friesland.....	Mature	6823-80	252-90	3-71	254	J. N. Duff, Musi, P.O. Box 3, Marandellas.
Beans.....	G. Friesland.....	Mature	10815-00	396-36	3-66	300	
Bokkie.....	G. Friesland.....	Mature	6712-30	246-19	3-67	228	
Cyanet.....	G. Friesland.....	Mature	5478-80	227-34	4-15	236	
Esther.....	G. Friesland.....	4 years	8808-30	333-13	3-78	300	
Flora.....	G. Friesland.....	Mature	8510-90	288-44	3-39	290	
Ginger.....	G. Friesland.....	Mature	7037-60	255-96	3-64	277	
Gipsy.....	G. Friesland.....	Mature	7673-70	299-18	3-90	249	
Heather.....	G. Friesland.....	Mature					

## SEMI-OFFICIAL MILK RECORDS—(continued)

Name of Cow.	Breed.	Age.	Milk in lbs.	B. Fat in lbs.	Average Percentage B. Fat.	No. of Days.	Name and Address of Owner.
Maduba.....	G. Friesland.....	Mature	7751-60	297-63	3-84	300	D. M. Edwards, P.O. Box 11, Elfel Flats.
Rebecca.....	G. Friesland.....	4 years	6131-00	242-01	3-95	241	
Roly.....	G. Friesland.....	Mature	8088-30	320-40	3-96	300	
Sandy.....	G. Friesland.....	4 years	7541-40	256-41	3-40	249	
Sarah.....	G. Friesland.....	Mature	10453-60	393-25	3-76	300	
Sixpence.....	G. Friesland.....	Mature	8260-70	269-98	3-27	265	
Spinich.....	G. Friesland.....	Mature	8109-80	291-83	3-60	300	
Tickle.....	G. Friesland.....	4 years	8629-80	361-29	4-19	273	
Jean.....	G. Friesland.....	Mature	10489-50	371-92	3-51	300	
Annetta II.....	G. Friesland.....	4 years	6387-00	239-68	3-75	300	J. H. Engelbrecht, P.O. Box 13, Que Que.
Chrome.....	G. Friesland.....	Mature	7860-40	259-93	3-31	300	
Faith.....	G. Jersey.....	Mature	6587-20	248-37	3-99	300	
Ushwala.....	G. Friesland.....	Mature	7029-80	242-27	3-45	249	
No. 10/8.....	G. Friesland.....	2 years	6223-00	236-03	3-81	300	W. F. Fischer, Coldstream Dairy, P.O. Headlands.
No. 11/7.....	G. Friesland.....	3 years	7726-00	255-23	3-26	300	
No. 13/7.....	G. Friesland.....	3 years	6903-00	255-28	3-85	290	
No. 36/7.....	G. Friesland.....	3 years	7351-00	285-99	3-89	300	
No. 7 A.....	G. Friesland.....	Mature	7585-50	246-42	3-25	300	
No. 7 B.....	G. Friesland.....	4 years	7660-50	290-69	3-79	298	
No. 9 A.....	G. Friesland.....	3 years	8867-00	322-35	3-64	300	
No. 412.....	G. Friesland.....	Mature	8853-00	340-28	3-84	300	
No. 434.....	G. Friesland.....	Mature	10082-50	400-19	3-97	300	
No. 454.....	G. Friesland.....	Mature	8729-00	338-84	3-88	300	
No. 500.....	G. Friesland.....	Mature	8131-00	279-77	3-44	300	
No. 502.....	G. Friesland.....	Mature	7282-00	263-17	3-61	273	
No. 569.....	G. Friesland.....	Mature	7233-50	281-27	3-89	185	
No. 593.....	G. Friesland.....	Mature	7196-00	302-34	4-20	293	
No. 28.....	G. Friesland.....	Mature	7654-00	263-76	3-45	300	P. Freeland, Lingfield, P.O. Gwelo.
No. 39.....	G. Friesland.....	4 years	6382-20	241-77	3-79	300	
No. 40.....	G. Friesland.....	Mature	8739-10	295-19	3-38	300	
No. 84.....	G. Friesland.....	Mature	6536-00	232-50	3-56	300	
No. 175.....	G. Friesland.....	Mature	8129-70	283-52	3-49	300	



Daisybelle.....	G. Friesland.....	7950-90	317-12	3-99	290	G. G. Futter, Marjoribanks Farm, P.O. Gwelo.
Rosabelle.....	G. Guernsey.....	6179-40	237-12	3-84	275	
Whitface.....	G. Friesland.....	8523-60	319-31	3-75	300	
Kathleen of Hatcliffe.....	G. Friesland.....	7356-00	284-23	3-87	300	Mrs. H. D. Gamble, P.O. Box 1629, Salisbury.
Billy.....	G. Friesland.....	10184-00	336-19	3-30	300	Hon. H. V. Gibbs, P. Bag 52L, Bulawayo.
Irène.....	G. Friesland.....	7064-00	261-30	3-70	300	
Mary.....	G. Friesland.....	10307-00	339-13	3-29	300	
Stripey.....	G. Friesland.....	11765-00	388-49	3-30	300	R. Gordon Lennox, Rakodzi, P.O. Marandellas.
Terry.....	G. Friesland.....	8137-00	259-97	3-19	300	
Val.....	G. Friesland.....	9368-00	335-22	3-58	300	
Rebecca.....	G. Friesland.....	5356-00	225-20	4-20	300	Government Demonstration Farm, P.O. Karol.
Rosa.....	G. Friesland.....	5591-00	226-32	4-20	300	
Tarisira.....	G. A. Angus.....	6967-00	248-98	3-57	300	
Barlows Vergelegen Hostuff.....	P. B. Jersey.....	7051-60	335-39	4-75	300	Grasslands Experimental Station, P.O. Marandellas.
Judy.....	G. Jersey.....	7812-00	407-33	5-22	300	
No. 94.....	G. Friesland.....	12331-50	450-60	3-65	300	
No. 152.....	G. Friesland.....	8198-00	285-79	3-49	300	Umshandige Government Farm, P.O. Fort Victoria.
Dolly.....	G. Friesland.....	9434-00	337-56	3-58	300	
Joan.....	G. Friesland.....	12623-50	398-24	3-15	300	
Nanette.....	G. Friesland.....	9372-00	334-92	3-57	300	Green Bros., Tarvie, Guinea Fowl.
Patches.....	G. Friesland.....	11813-50	499-18	4-23	300	
Wendy.....	G. Friesland.....	11354-00	424-45	3-74	283	
No. 64.....	G. Friesland.....	6835-00	235-99	3-45	300	E. J. Hards, P.O. Box 61, Marandellas.
No. 68.....	G. Friesland.....	10445-50	378-69	3-63	300	
Torria.....	G. Friesland.....	6803-00	249-20	3-66	300	
James.....	G. Guernsey.....	5209-50	268-61	5-16	260	D. A. Harley, Harleyton, P.O. Beatrice.
McLorens II.....	G. Guernsey.....	5333-50	227-67	4-26	300	
Alice.....	G. Friesland.....	5511-60	239-40	4-34	300	
Buntyn.....	G. Guernsey.....	4970-30	236-58	4-76	300	
Dawn.....	G. Guernsey.....	4845-30	232-50	4-85	300	
Dorothy.....	G. Guernsey.....	5865-70	272-16	4-62	300	

## SEMI-OFFICIAL MILK RECORDS—(continued)

Name of Cow.	Breed.	Age.	Milk in lbs.	B. Fat in lbs.	Average Percentage B. Fat.	No. of Days.	Name and Address of Owner.
Ethel.....	G. Guernsey.	Mature	5671.50	283.30	5.00	300	
Gloria.....	G. Guernsey.	Mature	7029.00	329.72	4.69	300	
Isobel.....	G. Guernsey.	Mature	5843.60	320.58	4.59	300	
Julia.....	G. Guernsey.	Mature	5569.70	286.46	4.78	300	
Kathleen II.....	G. Guernsey.	Mature	5357.30	288.59	5.36	300	
Liv.....	G. Guernsey.	Mature	5889.60	281.97	4.77	300	
Myrtle II.....	G. Guernsey.	Mature	6051.80	305.47	5.05	300	
Olga.....	G. Guernsey.	Mature	4983.40	245.16	4.92	300	
Patricia.....	G. Guernsey.	4 years	4842.90	228.36	5.00	300	
Rosemarie.....	G. Guernsey.	Mature	4448.30	228.80	5.17	300	
Tilly.....	G. Guernsey.	Mature	5752.50	264.18	4.59	300	
Virginia.....	G. Friesland.	Mature	4953.80	260.07	5.27	300	
Baldinnie.....	P. B. Jersey.....	3 years	5456.70	288.28	5.28	295	Home Park Estates, P.O. Macheke.
Jessie.....	G. Friesland.	Mature	6171.00	229.01	3.71	300	
Frikkie.....	G. Friesland.	Mature	7539.00	275.90	3.66	300	
Olga.....	G. Friesland.	Mature	11209.00	379.85	3.39	291	
Plum.....	G. Friesland.	3 years	8190.00	256.16	3.15	300	D. J. Huddy, P.O. Box 718, Salisbury.
Rinkle.....	G. Friesland.	Mature	7980.50	263.34	3.38	300	
Wattie.....	G. Friesland.	2 years	8994.50	308.22	3.54	300	
J 6/1/2.....	G. Friesland.	3 years	8170.00	333.92	4.09	300	
J 8/1/1/3.....	G. Friesland.	2 years	9440.00	341.20	3.61	300	J. Jamieson, P.O. Box 217, Bulawayo.
J 1/2/2.....	G. Friesland.	Mature	17211.00	589.60	3.43	300	
J 56/1/4.....	G. Friesland.	3 years	10411.00	366.91	3.52	300	
J 60/1/2.....	G. Friesland.	3 years	9336.00	358.52	3.84	300	
J 61/1/3.....	G. Friesland.	Mature	13736.00	464.54	3.40	300	
J 61/1/3.....	G. Friesland.	2 years	7385.00	275.53	3.73	300	
J 176/1/3.....	G. Friesland.	3 years	7351.00	246.85	3.36	300	
J 183/1.....	G. Friesland.	Mature	7231.00	236.06	3.26	300	
J 197/1.....	G. Friesland.	Mature	11156.00	413.36	3.71	300	

No. 11 A.....	G. Friesland.....	4 years	12316 00	399 15	3 24	300	D. S. Kabot, P.O. Box 261, Bulawayo.
No. 3 B.....	G. Friesland.....	4 years	7279 00	251 70	3 46	300	
No. 5 A.....	G. Friesland.....	4 years	10240 00	374 44	3 66	300	
No. 8 A.....	G. Friesland.....	Mature	11311 00	361 30	3 19	300	
No. 12 A.....	G. Friesland.....	4 years	9846 00	372 14	3 78	300	
No. 14 A.....	G. Friesland.....	4 years	7169 00	261 90	3 65	300	
No. 15 A.....	G. Friesland.....	Mature	804 17	304 17	3 88	300	
No. 16 A.....	G. Friesland.....	4 years	8208 00	323 96	3 95	300	
No. 25 A.....	G. Friesland.....	Mature	9138 00	344 93	3 77	300	
No. 26 A (Sold).....	G. Friesland.....	Mature	7430 00	255 47	3 44	219	
No. 29 A.....	G. Friesland.....	4 years	10430 00	369 35	3 54	279	R. Gordon Kay, P.O. Box 606, Bulawayo.
No. 32 A.....	G. Friesland.....	Mature	11100 00	341 89	3 08	300	
No. 33 A.....	G. Friesland.....	Mature	10330 00	333 96	3 23	300	
No. 37 A.....	G. Friesland.....	Mature	10488 00	349 25	3 34	300	
No. 40 A.....	G. Friesland.....	3 years	10886 00	250 22	3 74	300	
No. 41 A.....	G. Friesland.....	Mature	7124 00	286 73	3 14	300	
No. 45 A.....	G. Friesland.....	4 years	7430 00	256 15	3 44	300	
No. 48 A.....	G. Friesland.....	Mature	9572 00	331 52	3 46	300	
No. 58 A.....	G. Friesland.....	4 years	7879 00	266 49	3 38	300	
No. 59 A.....	G. Friesland.....	3 years	8782 00	288 95	3 29	295	
No. 60 A.....	G. Friesland.....	Mature	8583 00	227 97	3 45	300	B. H. Kew, P.O. Box 972, Bulawayo.
No. 62 A.....	G. Friesland.....	3 years	8529 00	306 20	3 59	300	
No. 65 B.....	G. Friesland.....	Mature	8234 00	226 76	3 52	300	
No. 65 B.....	G. Friesland.....	4 years	8734 00	300 90	3 72	300	
No. 67 B.....	G. Friesland.....	4 years	8084 00	300 90	3 72	300	
No. 73 B.....	G. Friesland.....	4 years	8166 00	338 97	4 15	300	
No. 59.....	G. Friesland.....	Mature	7325 00	244 01	3 33	300	
K 28.....	G. Friesland.....	Mature	9639 30	329 12	3 41	300	
K 32.....	G. Friesland.....	Mature	6543 80	231 74	3 54	300	
K 35.....	G. Friesland.....	Mature	6875 70	246 87	3 59	300	
K 39.....	G. Friesland.....	Mature	6603 40	231 15	3 50	300	
K 42.....	G. Friesland.....	Mature	9000 80	289 16	3 21	300	
K 51.....	G. Friesland.....	4 years	8561 40	276 77	3 31	300	
Kingston Daisy II.....	G. Friesland.....	2 years	8242 00	274 93	3 34	300	Kingston Farm Syn., P.O. Box 2, Bindura.
Kingston Sister.....	G. Friesland.....	3 years	8489 00	287 11	3 38	300	
Benuly.....	G. Guernsey.....	Mature	5283 80	241 26	4 57	300	J. A. G. Kirstein, P.O. Box 199, Gwelo.
Betty.....	G. Guernsey.....	3 years	4868 30	256 10	5 56	289	
Bones.....	G. Guernsey.....	Mature	6115 90	290 14	4 74	300	
Bulawayo.....	G. Guernsey.....	Mature	5018 90	241 37	4 81	292	
Daisy.....	G. Guernsey.....	4 years	238 79	238 79	4 26	300	
Certy.....	G. Guernsey.....	2 years	3085 40	268 54	5 13	286	
Gwen.....	G. Guernsey.....	2 years	4433 30	234 12	5 13	286	
			5557 20	243 94	4 39	300	

## SEMI-OFFICIAL MILK RECORDS—(continued)

Name of Cow.	Breed.	Age.	Milk in lbs.	B. Fat in lbs.	Average Percentage B. Fat.	No. of Days.	Name and Address of Owner.
Ivy.....	G. Guernsey.....	3 years	5990-60	299-30	5-00	300	J. H. Kruger, Rest a White, P.O. Fort Victoria.
Kockies.....	G. Guernsey.....	Mature	7954-40	282-27	3-55	300	
Lemoen.....	G. Guernsey.....	Mature	6564-70	290-25	4-42	300	
Letta Jnr.....	G. Guernsey.....	4 years	6113-20	292-51	4-78	300	
Lucy.....	G. Guernsey.....	4 years	5761-70	289-99	5-03	300	
Malette.....	G. Guernsey.....	Mature	6762-20	263-33	3-91	300	
Martha.....	G. Guernsey.....	Mature	5389-40	225-97	4-19	300	
Mary.....	G. Guernsey.....	Mature	5464-50	236-65	4-33	289	
Nelly.....	G. Guernsey.....	3 years	5774-10	270-67	4-69	300	
Susie.....	G. Guernsey.....	Mature	6014-10	270-99	4-51	300	
Ann.....	G. Friesland.....	Mature	7141-40	301-73	4-23	271	J. N. L. MacIwaine, P.O. Box 23, Marandellas.
Rosa.....	G. Friesland.....	Mature	7411-70	302-31	4-08	300	
White (Dead).....	G. Friesland.....	Mature	7372-60	285-54	3-85	285	
Larkhill Angeline.....	G. Friesland.....	3 years	7267-00	248-27	3-42	300	J. MacIntyre, P.O. Box 58, Shamva.
Larkhill Clarabelle.....	G. Friesland.....	3 years	6217-50	244-42	3-93	300	
Larkhill Eve.....	G. Friesland.....	3 years	7820-00	284-16	4-17	284	
Larkhill Jill.....	G. Friesland.....	3 years	7960-50	311-09	3-91	300	
Madge.....	G. Friesland.....	Mature	8108-00	264-20	3-27	300	
Larkhill Rosemary.....	G. Friesland.....	3 years	6983-50	245-29	3-51	300	
Larkhill Ruby.....	G. Friesland.....	3 years	6463-50	261-29	4-04	300	
Zonga Queen VI.....	P.B. Friesland.....	Mature	7602-50	317-37	4-17	287	
Comile.....	G. Friesland.....	3 years	8233-00	260-90	3-17	300	
Gundwane.....	G. Friesland.....	Mature	7137-00	315-45	4-42	300	J. U. McCay, P. Bag J 181, Bulawayo.
No. 128.....	G. Friesland.....	Mature	6469-00	238-68	3-68	300	
Butterfly.....	G. Friesland.....	Mature	8009-30	316-89	3-96	300	J. H. McLean, P.O. Box 161, Gwelo.
Eager.....	G. Friesland.....	2 years	7596-70	282-31	3-72	300	
Iris.....	G. Friesland.....	2 years	5497-10	233-40	4-25	298	
Sally II.....	G. Friesland.....	4 years	8320-30	293-18	3-52	290	
Saucer.....	G. Avshire.....	2 years	6625-10	295-36	4-46	300	
Snooky.....	G. Guernsey.....	Mature	6585-30	286-81	4-36	300	
Tiny II.....	G. Friesland.....	2 years	6355-70	262-09	4-12	293	

No. 7.....	G. Friesland.....	Mature	8339-30	355-95	4-27	300	L. McLean, P.O. Box 161, Gwelo.
No. 53.....	G. Friesland.....	Mature	8251-90	316-03	3-83	294	
No. 93.....	G. Friesland.....	Mature	6669-60	232-82	3-49	300	
Zoe.....	G. Friesland.....	4 years	9156-00	351-54	3-84	300	Meikle Trust & Invest. Co., Leachdale, P.O. Shangani.
No. 1.....	G. Friesland.....	Mature	5809-00	231-62	3-99	294	
No. 3.....	G. Friesland.....	Mature	8164-00	345-10	4-23	300	
No. 10.....	G. Friesland.....	Mature	8470-00	328-73	3-88	300	
No. 29.....	G. Friesland.....	Mature	7293-00	261-07	3-58	300	
No. 30.....	G. Friesland.....	3 years	6309-00	244-40	3-87	300	
No. 64.....	G. Guernsey.....	Mature	8490-00	320-49	3-77	300	
P 17/5.....	P.B. Friesland.....	4 years	7088-00	238-72	3-23	300	
G 30/0.....	G. Friesland.....	Mature	7375-00	232-79	3-16	300	C. F. Mitchell, Manzana Farm, P.O. Essexvale.
Dawn.....	G. Red Poll.....	Mature	6929-00	237-65	3-43	293	
Megan.....	G. Red Poll.....	4 years	6323-00	236-50	3-74	300	R. L. Moffat, Ormiston, P.O. Shangani.
Charlotte.....	G. Ayrshire.....	Mature	7325-00	301-84	4-12	300	
Titch I.....	G. Ayrshire.....	4 years	4951-00	247-86	5-01	271	F. B. Morrisby, Sunnyside, P.O. Gwelo.
Venus I.....	G. Ayrshire.....	Mature	5456-00	239-36	4-39	271	
No. 152.....	G. Friesland.....	Mature	8069-00	263-46	3-27	300	K. Norvall, P.O. Box 637, Bulawayo.
Stoop II.....	G. Friesland.....	Mature	7192-00	256-06	3-56	300	
Zenda II.....	G. Friesland.....	4 years	7749-00	243-13	3-02	273	Mrs. E. L. Parkes, P.O. Box 159, Salisbury.
Citis Dame.....	G. Jersey.....	Mature	5090-00	248-22	4-88	270	
Dairy.....	G. Jersey.....	Mature	5338-50	292-97	5-49	270	
Dumblane.....	G. Jersey.....	Mature	8727-00	438-28	5-02	300	
Junc.....	G. Jersey.....	3 years	5151-00	274-53	5-33	270	J. D. Parsons, P.O. Box 7, Bulawayo.
Samuelle.....	G. Jersey.....	Mature	5193-00	261-99	5-05	269	
Butterknife.....	G. Friesland.....	3 years	12421-00	381-95	3-07	300	
Butterpat.....	G. Friesland.....	4 years	11225-00	349-61	3-11	300	H. J. Quinton, P. Bag 16A, Salisbury.
Doreen.....	G. Friesland.....	2 years	8109-00	251-92	3-11	300	
Lob.....	G. Friesland.....	3 years	12794-00	394-22	3-08	300	
Princess.....	G. Friesland.....	Mature	12770-00	392-58	3-07	300	
Linde.....	G. Guernsey.....	3 years	5105-50	238-40	4-67	295	
Eirene.....	G. Friesland.....	Mature	10504-50	348-74	3-32	300	H. P. Raynor, Newton, P.O. Marandellas.
Moir.....	G. Friesland.....	4 years	8285-00	306-38	3-70	300	





Name	Breed	Age	Weight	Height	Milk	Butter	Owner
Bramble.....	G. Friesland.....	Mature	8143-00	269-00	3-30	300	M. Tracey, P. Bag 21, Gatooma.
Patches.....	G. Friesland.....	Mature	10644-00	366-30	3-44	290	Mrs. M. Turnbull, P.O. Box 479, Bulawayo.
Walf.....	G. Friesland.....	3 years	6506-80	238-38	3-66	300	
April.....	G. Friesland.....	Mature	9380-00	342-87	3-66	300	R. O. Waldschutz, P.O. Box 27, Marandellas.
Cyrene.....	G. Friesland.....	Mature	8341-00	328-59	3-94	300	
Margie II.....	G. Friesland.....	Mature	1914-00	362-78	3-04	300	
Paris III.....	G. Friesland.....	3 years	6027-00	239-25	3-97	280	
Peach.....	G. Friesland.....	Mature	7957-00	267-29	3-36	276	

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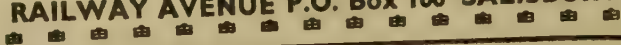


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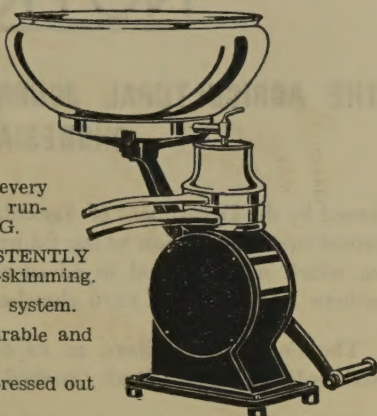


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